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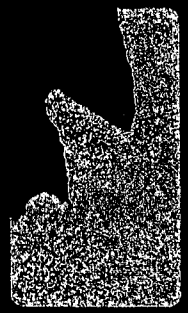

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health

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NIOSH POCKET GUIDE TO CHEMICAL HAZARDS

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

June 1990

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7353

PREFACE

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

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

This revision of the *Pocket Guide* includes current exposure limits, updated sampling and analytical methods, new respirator selections for chemicals with revised exposure limits, flammability/combustibility ratings, and specific gravities.

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7353

CONTENTS

Preface iv
Acknowledgments vi

I. Introduction 1
II. NIOSH Recommendations 2
III. How to Use This Pocket Guide 3
IV. Chemical Listing 29

Appendix A — NIOSH Occupational Carcinogens 230
Appendix B — Thirteen OSHA-Regulated Carcinogens 231
Appendix C — Supplementary Exposure Limits 232
Appendix D — Substances with No Established RELs 235
Synonym and Trade Name Index 236
CAS Number Index 241

000006

7353

ACKNOWLEDGMENTS

The Division of Standards Development and Technology Transfer (DSDTT), National Institute for Occupational Safety and Health (NIOSH), had primary responsibility for the development of the *Pocket Guide*.

We would like to express our graditude to the following people within DSDTT for their assistance in preparing the document: D. Case and R. Rogers for reformatting and computerization; R. Schuler, B. Proctor, L. Schoolfield, and L. Foster for data acquisition; T. Combs, S. Cheesman, and J. Mefford for typing; A. Hamilton and R. Grubbs for editorial review; R. Zumwalde, D. Johnson, L. Reed, and H. Ahlers for policy review; and C. Ellison, P. Robbins, and H. Ludwig (technical editor) for reviewing data and incorporating changes. In addition, the following people from other Divisions in NIOSH also contributed greatly to developing this document: D. Dollberg and P. Eller from the Division of Physical Sciences and Engineering (DPSE) for the development of the measurement methods section, G. Choudhary from DPSE for assistance in determining chemical reactivities, and N. Bollinger and R. Schutz 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 development and subsequent revisions.

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I. 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* does not contain an analysis of all pertinent data; rather, it presents key information and data in abbreviated tabular form for 398 chemicals or substance groupings (*e.g.*, cyanides, fluorides, manganese compounds, etc.) that are found in the work environment and that have existing Occupational Safety and Health Administration (OSHA) regulations. The industrial hygiene information found in the *Pocket Guide* should help users recognize and control occupational chemical hazards. The chemicals contained in this revision are substances previously listed in the OSHA Z-1, Z-2, and Z-3 Tables (many of which now have revised permissible exposure limits [PELs]). Additional substances that were included as part of the new OSHA Z-1-A Table on January 19, 1989, will be incorporated into the next edition of the *Pocket Guide*.

Background

In 1974, the National Institute for Occupational Safety and Health (NIOSH) (which is responsible for recommending health and safety standards) joined OSHA (whose jurisdictions include promulgation and enforcement activities) in developing a series of complete 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 criteria documents and Current Intelligence Bulletins (CIBs), and recognized references in the fields of industrial hygiene, occupational medicine, toxicology, and analytical chemistry.

000008

II. NIOSH RECOMMENDATIONS

Acting under the authority of the Occupational Safety and Health Act of 1970 (Public Law 91-596), 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.

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.

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.) is scheduled for publication in 1990.

7353

III. 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-) have been indicated where applicable. A page index for selected synonyms and trade names is included at the back of the *Pocket Guide* to help the user locate a specific substance.

CAS and RTECS Numbers. — Below the chemical structure/formula is the Chemical Abstracts Service (CAS) registry number. This number, in the format xxx-xx-x, is unique for each chemical and allows efficient searching on computerized data bases. A page index for all CAS registry numbers listed is included at the back of the *Pocket Guide* to help the user locate a specific substance.

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

DOT ID and Guide Number. — Under the RTECS number are the U.S. Department of Transportation (DOT) identification number and the corresponding guide number. Their format is xxxx xx. The Identification number (xxxx) indicates that the chemical is regulated by DOT. The Guide number (xx) refers to actions to be taken to stabilize an emergency situation; this information can be found in the DOT 1987 *Emergency Response Guidebook*, DOT P 5800.4 (Office of Hazardous Materials Transportation [DHM-51], Research and Special Programs Administration, U.S. Department of Transportation, 400 Seventh Street S.W., Washington, D.C. 20590).

Synonyms, Trade Names, and Conversion Factors

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

*Code of Federal Regulations.

000010

7353

(parts per million parts of air) to mg/m³ (milligrams per cubic meter of air) at 68°F and 1 atmosphere are listed for all liquids and gases.

Exposure Limits

The NIOSH 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 an occupational carcinogen is designated by the notation "Ca" (see Appendix A, which contains a brief discussion of occupational carcinogens).

The OSHA permissible exposure limits (PELs), as found in Tables Z-1-A or Z-2 of the OSHA General Industry Air Contaminants Standard (29 CFR 1910.1000), are listed next. Unless noted otherwise, PELs are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. A STEL is designated by "ST" preceding the value and is measured over a 15-minute period unless noted otherwise. OSHA ceiling concentrations (designated by "C" preceding the value) must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure. In addition, beryllium, ethylene dibromide, and methylene chloride (from Table Z-2) have PEL ceiling values that must not be exceeded except for a maximum peak over a specified period. Appendix B contains a brief discussion of carcinogens regulated by OSHA.

The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) are also listed when they are more restrictive than the OSHA PEL or NIOSH REL. Unless noted otherwise, TLVs are 8-hour TWA concentrations. Ceiling concentrations (which should not be exceeded at any time) are designated by "C". A STEL is designated by "ST" and is measured over a 15-minute period. Where applicable, the ACGIH A1 (confirmed human carcinogen) and A2 (suspected human carcinogen) designations for individual chemicals are included. The ACGIH TLVs for 1989-1990 were used for this printing of the *Pocket Guide*.

Concentrations are given in ppm, mg/m³, or fibers per cubic centimeter (fibers/cm³). 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. Appendix C contains more detailed discussions of

000011

7353

the specific exposure limits for asbestos, the various chromium compounds, coal tar pitch volatiles, and cotton dust. Appendix D contains a brief discussion of substances with no established RELs.

IDLH

Immediately dangerous to life or health concentrations (IDLHs) represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing (e.g., severe eye irritation) or irreversible health effects. These values were determined during the Standards Completion Program only for the purpose of respirator selection. The notation "Ca" appears in this column for all substances that NIOSH considers to be potential human carcinogens (NIOSH recommends the most protective respirators for exposure to these substances). However, the IDLHs that were originally determined in the Standards Completion Program are shown in brackets following the "Ca" designation (note: carcinogenic effects were not considered in the Standards Completion Program). "Unknown" indicates that because of a lack of data, no IDLH could be determined. "LEL" indicates that the IDLH is based on the lower explosive limit. "N.E." indicates that no evidence could be found for the existence of an IDLH.

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, 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 limit in air, % by volume (at room temperature*)

See footnotes at end of table.

000012

LEL ..... Lower explosive limit in air, % by volume (at room temperature*)
Sp.Gr..... Specific gravity at 68°F* referenced to water at 39.2°F(4°C)

*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 direct-reading instruments.

When possible, the flammability of a substance was determined and listed below 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) collection method, (2) sample work-up, (3) analytical method, and (4) method number. The method number is from the 2nd or 3rd edition (i.e., II or III) of the *NIOSH Manual of Analytical Methods* (DHHS [NIOSH] Publication No. 84-100). If the 2nd edition is cited, this fact is noted along with the appropriate volume number [e.g., II(4)]. In a number of instances, the table cites the *1985 OSHA Analytical Methods Manual* and applicable method number (e.g., OSHA [#21]). "None available" indicates that no method has been developed by NIOSH or OSHA. 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 sup-

plement 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:

CLOTHING:	Describes conditions that require chemical protective clothing.
GOGGLES:	Describes conditions that require eye protection.
WASH:	Tells when workers should clean the spilled chemical from the body (in addition to normal washing before eating, smoking, etc.).
CHANGE:	Tells when routine changes of clothing are advisable.
REMOVE:	Advises workers when to remove clothing that has been accidentally contaminated.
PROVIDE:	Recommends the availability of eyewash and quick drench equipment.

Recommendations for Respirator Selection

This column provides a condensed table of allowable respirator use. Each line lists in ppm or mg/m³ a maximum concentration for use (commonly referred to as MUC, maximum use concentration) or condition (i.e., emergency or planned entry into unknown concentrations or IDLH conditions [designated by the symbol §], or escape from suddenly occurring respiratory hazards) followed by a series of codes representing classes of respirators. Individual respirator codes are separated by diagonal marks (/). For each MUC, the table lists only those respirators that possess the minimum required protection factor and other use restrictions based on the *NIOSH Respirator Decision Logic* (DHHS [NIOSH] Publication No. 87-108). All recommended respirators of a given class can be used at any concentration equal to or less than the MUC listed for that class.

The recommendations for respirator selection for each substance are based on the most restrictive occupational exposure limit found among the NIOSH REL, the OSHA PEL, and the ACGIH TLV.

In the *Pocket Guide*, single-use respirators refer only to disposable respirators that have been tested under the provisions of 30 CFR 11.140-5 and that have an established protection factor of 5. To determine whether certain single-use respirators can be used for other applications, including those that require a higher protection factor, consult the *NIOSH Certified Equipment List* (DHHS [NIOSH] Publication No. 89-105). If a higher protection factor is required, the wearer must first be properly fitted with a respirator using either a quantitative fit test or the "improved" qualitative fit test, as accepted in the OSHA lead standard (29 CFR 1910.1025).

All respirators selected must be approved by NIOSH

7353

and MSHA under the provisions of 30 CFR 11. Since an air-purifying respirator must be specifically approved by NIOSH and MSHA for use with pesticides, pesticides are not identified as such in the respirator selection tables.

In addition, a complete respiratory protection program must be implemented and must fulfill all requirements of 29 CFR 1910.134. At a minimum, a respiratory protection program should include regular training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and storage. Selection of a specific respirator within a given class of recommended respirators depends on the particular situation; this choice should be made only by a knowledgeable person. *REMEMBER:* air-purifying respirators will not protect users against oxygen-deficient atmospheres, and they are not to be used in IDLH conditions. The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full facepieces and are operated in a pressure-demand or other positive-pressure modes. Additional information on the selection and use of respirators can be found in the *NIOSH Respirator Decision Logic* and the *NIOSH Guide to Industrial Respiratory Protection* (DHHS [NIOSH] Publication No. 87-116).

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

Route of Health Hazard

This column lists the toxicologically important routes of entry for each substance, abbreviated as follows:

Inh	Inhalation
Abs	Skin absorption
Ing	Ingestion
Con	Skin and/or eye contact

Symptoms

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

First Aid

This column lists first aid 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.

000015

Table 1. — Codes for measurement methods

7353

Code	Method/reagent
Collection method:*	
Ambersorb	Ambersorb® XE-347 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
Porapak	Porapak® tube
Si gel	Silica gel tube
Tenax GC	Tenax® GC tube
T-Sorb	Thermosorb® tube
Vertical elut	Vertical elutriator
XAD	XAD® tube

Code	Method/reagent
Sample work-up:	
CCl_4	Carbon tetrachloride
CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane
$CHCl_3$	Chloroform
CH_2Cl_2	Methylene chloride
CH_3CN	Acetonitrile
CH_3COOH	Acetic acid
CS_2	Carbon disulfide
DMF	Dimethylformamide
$FeCl_3$	Ferric chloride
HCl	Hydrochloric acid
HCOOH	Formic acid
HNO_3	Nitric acid
H_2O_2	Hydrogen peroxide
HPLC	High-pressure liquid chromatography
H_2SO_4	Sulfuric acid
KOH	Potassium hydroxide
LTA	Low-temperature ashing
Na_2CO_3	Sodium carbonate
$NaHCO_3$	Sodium bicarbonate

(Continued)

9

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.

7353

Table 1. — Codes for measurement methods (Continued)

Code	Method/reagent
Sample work-up (continued):	
NaOH	Sodium hydroxide
NH_4OH	Ammonium hydroxide
Pho-acid	Phosphomolybdic acid
Thermal desorp	Thermal desorption apparatus
THF	Tetrahydrofuran
Analytical method:	
AA	Atomic absorption spectrometry
ECA	Electrochemical analysis
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/TEA	GC with thermal energy analyzer detection
Grav	Gravimetric
HGA	Flameless atomic absorption with a high-temperature graphite analyzer
HPLC/FLD	High-pressure liquid chromatography with fluorescence detection
HPLC/UVD	High-pressure liquid chromatography with ultraviolet detection
IC	Ion chromatography
ICP	Inductively coupled plasma
IR	Infrared spectrometry
ISE	Ion-specific electrode
PCM	Phase contrast microscopy
PES	Plasma emission spectroscopy
PLR	Polarography
Titrate	Titration
Vis	Visible spectrophotometry
XRF	X-ray fluorescence spectrometry
XRD	X-ray diffraction spectrometry

000017

7353

Table 2. — Ordering information for measurement methods

Manual	Publication No.	Ordering No.
NIOSH Manual of Analytical Methods, 2nd edition:		
Vol. I	NIOSH 77-157-A	PB-274-845
Vol. II	NIOSH 77-157-B	PB-276-624
Vol. III	NIOSH 77-157-C	PB-276-838
Vol. IV	NIOSH 78-175	PB-83-105-437
Vol. V	NIOSH 79-141	PB-83-105-445
Vol. VI	NIOSH 80-125	PB-82-157-728
Vol. VII	NIOSH 82-100	PB-83-105-452
NIOSH Manual of Analytical Methods, 3rd edition	NIOSH 84-100	PB-85-179-018
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
OSHA Analytical Methods Manual, 1985 edition	—	4540*, 4541 (fiche)*

*Denotes ordering number of the American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave., Building D-7, Cincinnati, OH 45211 (513-661-7881). All other ordering numbers are for the National Technical Information Service (NTIS), Springfield, VA 22161 (703-487-4650).

000018

Table 3. — Personal protection and sanitation codes

7353

Code	Definition
CLOTHING	Wear appropriate equipment to prevent:
Any poss liq/Repeat vap	Any possibility of liquid contact and repeated or prolonged vapor contact with skin
Any poss	Any possibility of skin contact
Any poss wet	Any possibility that skin will become wet with contaminant
Any poss >x%/Repeat y%	Any possibility of skin contact with liquids containing >x% of contaminant and repeated or prolonged skin contact with liquids containing y%
Any poss pH <x/Repeat pH >x	Any possibility of skin contact with solutions having a pH <x and repeated or prolonged skin contact with solutions having a pH >x
Prevent skin freezing	Self explanatory
Prevent contam or freezing	Contamination or freezing of skin
Prevent wet or freezing	Wetting or freezing of skin
Repeat	Repeated or prolonged skin contact
Reason prob	Reasonable probability of skin contact
GOGGLES	Wear eye protection to prevent:
Any poss	Any possibility of eye contact
Any poss >x%/ Reason prob <y%	Any possibility of eye contact with liquids containing >x% of contaminant and reasonable probability of eye contact with liquid containing <y%
Any poss molt/ Reason prob liq-sol	Any possibility of eye contact with substance in a molten form and reasonable probability of eye contact with a liquid or solid containing the substance
Any poss (xxx)	Any possibility that substance xxx will contact the eyes

(Continued)

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

Code	Definition
GOGGLES (Continued)	
Reason prob	Reasonable probability of eye contact
Repeat	Repeated or prolonged eye contact
WASH	Workers should wash:
Daily	At the end of each work shift
Daily (reason prob)	At the end of each work shift when there is reasonable probability of contact with the contaminant
Immed contam	Immediately when skin becomes contaminated
Immed contam >x%/ Prompt contam y%	Immediately when skin is contaminated with liquids containing >x% contaminant and promptly when skin is contaminated with y%
Immed contam >x%/ Prompt wet y%	Immediately when skin is contaminated with liquids containing >x% contaminant and promptly when skin becomes wet with y%
Immed contam/daily	Immediately when skin becomes contaminated and at the end of each work shift
Immed contam pH <x/ Prompt wet pH >x	Immediately when skin becomes contaminated with liquid of pH <x and promptly when skin becomes wet with liquid of pH >x
Immed wet	Immediately when skin becomes wet
Immed wet/Prompt contam	Immediately when skin becomes wet and promptly when skin becomes contaminated
Immed wet/Prompt contam/daily	Immediately when skin becomes wet, promptly when skin becomes contaminated, and at the end of each work shift

(Continued)

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

Code	Definition
WASH (Continued)	
Prompt contam	Promptly when skin becomes contaminated
Prompt contam/daily	Promptly when skin becomes contaminated and at the end of each work shift
Prompt wash soap	Promptly wash with soap when skin becomes contaminated
Prompt wet	Promptly when skin becomes wet
CHANGE	Work clothing should be changed daily:
After work if any poss contam	If there is any possibility that the clothing may be contaminated
After work if reason prob contam	If it is reasonably probable that the clothing may be contaminated
REMOVE	Remove clothing:
Immed contam	Immediately if it becomes contaminated
Immed wet	Immediately if it becomes wet
Immed wet (flamm)	Immediately if it becomes wet (to avoid flammability hazard)
Immed wet/immed non-imperv contam	Immediately if it becomes wet or if it is non-impervious clothing that becomes contaminated
Immed non-imperv contam	Immediately if it is non-impervious clothing that becomes contaminated
Immed non-imperv contam >x%/ Prompt non-imperv contam y%	Immediately if it is non-impervious clothing that becomes contaminated with liquids containing >x% of contaminant and promptly if clothing is contaminated with y%

(Continued)

7353

000021

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

Code	Definition
REMOVE (Continued)	
Immed non-imperv wet/ prompt non-imperv contam	Immediately if it is non-impervious clothing that becomes wet and promptly if it is non-impervious clothing that becomes contaminated
Prompt non-imperv contam	Promptly if it is non-impervious clothing that becomes contaminated
Prompt non-imperv wet	Promptly if it is non-impervious clothing that becomes wet
PROVIDE	The following equipment should be available:
Eyewash	Self-explanatory
Quick drench	Self-explanatory
Eyewash (xxx)	Eyewash if substance xxx is present
Eyewash >x%	Eyewash if liquids containing >x% of contaminant are present
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 any detectable concentration
§	Emergency or planned entry into unknown concentrations or IDLH conditions
£	Substance causes eye irritation or damage; eye protection needed
*	Substancxe reported to cause eye irritation or damage; may require eye protection
^	If not present as a fume
¿	Only nonoxidizable sorbents are allowed (not charcoal)
†	End of service life indicator (ESLI) required
APF	Assigned protection factor
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

(Continued)

7353

000023

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

Item	Definition
Code component (continued):	
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
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

(Continued)

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

Item	Definition
Code (continued):	
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
CROVHiE (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
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

(Continued)

7353

000025

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

Item	Definition
Code (continued):	
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
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

(Continued)

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

Item	Definition
Code (continued):	
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)
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)

7353

000027

7353

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
SCBA (APF = 10)	Any self-contained breathing apparatus
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

0000028

7353

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

Abbreviation	Symptom/organ
abdom	Abdominal
album	Albuminuria
anes	Anesthesia
anor	Anorexia
anos	Anosmia
appre	Apprehension
arrhy	Arrhythmias
asphy	Asphyxia
BP	Blood pressure
breath	Breathing
bron	Bronchitis
broncopneu	Bronchopneumonia
bronspas	Bronchospasm
BUN	Blood urea nitrogen
[carc]	Carcinogen
card	Cardiac
chol	Cholinesterase
cirr	Cirrhosis
CNS	Central nervous system
conf	Confusion
conj	Conjunctivitis
constip	Constipation
constric	Constriction
convuls	Convulsions
CVS	Cardiovascular system
cyan	Cyanosis
depres	Depressant/depression
derm	Dermatitis
diarr	Diarrhea
dist	Disturbance
dizz	Dizziness
drow	Drowsiness
dysp	Dyspnea
emphy	Emphysema
eosin	Eosinophilia
epis	Epistaxis
equi	Equilibrium
eryt	Erythema
euph	Euphoria
fail	Failure
fasc	Fasiculation
FEV	Forced expiratory volume
fib	Fibrosis
fibrl	Fibrillation
ftg	Fatigue
func	Function

(Continued)

000029

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

Abbreviation	Symptom/organ
GI	Gastrointestinal
gidd	Giddiness
halu	Hallucinations
head	Headache
hemato	Hematopoietic
hemog	Hemoglobinuria
hemorr	Hemorrhage
hypox	Hypoxemia
incr	Increase(d)
ict	Icterus
Inco	Incoordination
inflamm	Inflammation
inj	Injury
insom	Insomnia
irreg	Irregular
irrit	Irritation
irrity	Irritability
jaun	Jaundice
kera	Keratitis
lac	Lacrimation
lar	Laryngeal
lass	Lassitude
leucyt	Leukocytosis
leupen	Leukopenia
li-head	Lightheadedness
low-wgt	Weight loss
mal	Malaise
malnut	Malnutrition
monocy	Monocytosis
muc memb	Mucous membrane
musc	Muscle
narco	Narcosis
nau	Nausea
nec	Necrosis
neph	Nephritis
ner	Nervousness
numb	Numbness
opac	Opacity
palp	Palpitations
para	Paralysis
pares	Paresthesia
perf	Perforation
peri neur	Peripheral neuropathy
periorb	Periorbital
phar	Pharyngeal
photo	Photophobia

(Continued)

7353

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

Abbreviation	Symptom/organ
pig	Pigmentation
pneu	Pneumonia
pneuitis	Pneumonitis
PNS	Peripheral nervous system
polyneur	Polyneuropathy
prot	Proteinuria
pulm	Pulmonary
RBC	Red blood cell
resp	Respiratory
retster	Retrosternal
rhin	Rhinorrhea
salv	Salivation
sens	Sensitization
sez	Seizure
som	Somnolence
subs	Substernal
sweat	Sweating
swell	Swelling
sys	System
tacar	Tachycardia
tend	Tenderness
trachbronc	Tracheobronchitis
venfib	Ventricular fibrillation
verti	Vertigo
vesic	Vesiculation
vis dist	Visual disturbance
vomit	Vomiting
weak	Weakness
wheez	Wheezing

7353

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 immed (15 min) ..	If this chemical contacts the eyes, immediately wash the eyes with large amounts of water and continue flushing for 15 minutes, 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.
Medical attention ...	Self-explanatory
Skin:	
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.
Medical attention for frostbite	If this chemical contacts the skin or mouth, stop the exposure immediately. If frostbite has occurred, get medical attention.
Molten flush immed/ sol-liq soap wash prompt	If this molten chemical contacts the skin, immediately flush the skin with large amounts of water. Get medical attention immediately. If this chemi-

(Continued)

000032

7353

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

Code	Definition
Skin (continued):	
	cal (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.
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,

(Continued)

000033

7353

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

Code	Definition
Skin (continued):	
	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.

000034

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

Code	Definition
Skin (continued):	
	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 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 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

(Continued)

000035

7353

000036

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Acetaldehyde CH_3CHO 75-07-0 AB1925000 1089 26	Acetic aldehyde, Ethanal, Ethyl aldehyde 1 ppm = 1.83 mg/m³	NIOSH Ca See Appendix A OSHA 100 ppm (180 mg/m³) ST 150 ppm (270 mg/m³)	Ca [10,000 ppm]	Colorless liquid or gas (above 69°F) with a pungent, fruity odor.	MW: 44.1 BP: 69°F Sol: Miscible Fl.P: -36°F IP: 10.22 eV 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; III [#2538]
Acetic acid CH_3COOH 64-19-7 AF1225000 1842 29 (soln) 2790 60 (10-80% acid) 2789 29 (80% acid)	Acetic acid (aqueous), Ethanoic acid, Glacial acetic acid (pure compound), Methanecarboxlyic acid [Note: Can be found in concentrations of 5-8% in vinegar.] 1 ppm = 2.50 mg/m³	NIOSH 10 ppm (25 mg/m³) ST 15 ppm (37 mg/m³) OSHA 10 ppm (25 mg/m³)	1000 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 Fl.P: 102°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; III [#1603]
Acetic anhydride $(CH_3CO)_2O$ 108-24-7 AK1925000 1715 39	Acetic acid anhydride, Acetic oxide, Acetyl oxide, Ethanoic anhydride 1 ppm = 4.24 mg/m³	NIOSH/OSHA C 5 ppm (20 mg/m³)	1000 ppm	Colorless liquid with a strong, pungent, vinegar-like odor.	MW: 102.1 BP: 282°F Sol: 12% Fl.P: 120°F IP: 10.00 eV Sp.Gr: 1.08 Class II Combustible Liquid	VP: 4 mm FRZ: -99°F UEL: 10.3% LEL: 2.7%	Water, alcohols, strong oxidizers (especially chromic acid), amines, strong caustics [Note: Corrosive to iron, steel & other metals. Reacts with water to form acetic acid.]	Bub; Reagent; Vis; III [#3506]
Acetone CH_3COCH_3 67-64-1 AL3150000 1090 26	Dimethyl ketone, Ketone propane, 2-Propanone 1 ppm = 2.42 mg/m³	NIOSH 250 ppm (590 mg/m³) OSHA 750 ppm (1800 mg/m³) ST 1000 ppm (2400 mg/m³)	20,000 ppm [Note: Enforcement of the OSHA TWA for "doffers" in the cellulose acetate fiber industry was stayed on 9/5/89 until 9/1/90; further, the OSHA STEL does NOT apply to that industry.]	Colorless liquid with a fragrant, mint-like odor.	MW: 58.1 BP: 133°F Sol: Miscible Fl.P: 0°F IP: 9.69 eV Sp.Gr: 0.79 Class IB Flammable Liquid	VP: 180 mm FRZ: -140°F UEL: 13% LEL: 2.5%	Oxidizers, acids	Char; CS_2; GC/FID; III [#1300, Ketones I]

7353

000037

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Any poss Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing	Eye, nose, throat irrit; conj; cough; CNS depres; eye, skin burns; derm; delayed pulm edema; [carc]	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, kidneys
Clothing: Any poss >50%/Repeat 10-49% Goggles: Any poss Wash: Immed contam >50%/Prompt 10-49% Change: N.R. Remove: Immed non-imperv contam >50%/Prompt non-imperv contam 10-49% Provide: Eyewash (>5%)/Quick drench (>50%)	NIOSH/OSHA 250 ppm: SA:CF[£]/PAPROV[£] 500 ppm: CCRFOV/SCBAF/SAF/GMFOV/PAPRTOV[£] 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Conj, lac; irrit nose, throat; phar edema, chronic bron; burns eyes, skin; skin sens; dental erosion; black skin, hyperkeratosis	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes, teeth
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 125 ppm: SA:CF[£]/PAPROV[£] 250 ppm: CCRFOV/SCBAF/SAF/GMFOV/PAPRTOV[£] 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Conj, lac, corneal edema, opac, photo; nasal, phar irrit; cough, dysp, bron; skin burns, vesic, sens derm	Eye: Skin: Irr immed Breath: Water flush immed Swallow: Resp support Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 1000 ppm: CCROV*/PAPROV*/SA*/SCBA* 6250 ppm: SA:CF* 12,500 ppm: GMFOV/SCBAF/SAF 20,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; head, dizz; derm	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin

Acetone

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Acetonitrile CH_3CN 75-05-8 AL7700000 1648 28	Cyanomethane, Ethyl nitrile, Methyl cyanide 1 ppm = 1.71 mg/m³	NIOSH 20 ppm (34 mg/m³) OSHA 40 ppm (70 mg/m³) ST 60 ppm (105 mg/m³)	4000 ppm ACGIH [skin]	Colorless liquid with an aromatic odor.	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; III [#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	Tan, crystalline powder.	MW: 223.3 BP: ? Sol: Insoluble Fl.P: ? IP: ? Combustible Solid	VP: ? MLT: 381°F UEL: ? LEL: ?	None reported	None available
Acetylene tetrabromide $CHBr_2CHBr_2$ 79-27-6 KI8225000 2504 58	Symmetrical tetrabromo-ethane; TBE; Tetrabromoacetylene; Tetrabromoethane; 1,1,2,2-Tetrabromoethane 1 ppm = 14.37 mg/m³	NIOSH See Appendix D OSHA 1 ppm (14 mg/m³)	10 ppm	Pale-yellow liquid with a pungent odor. [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; III [#2003]
Acrolein CH_2=CHCHO 107-02-8 AS1050000 1092 30 (inhibited)	Acraldehyde, Acrylaldehyde, Acrylic aldehyde, Allyl aldehyde, Propenal, 2-Propenal 1 ppm = 2.33 mg/m³	NIOSH/OSHA 0.1 ppm (0.25 mg/m³) ST 0.3 ppm (0.8 mg/m³)	5 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.]	XAD-2*; Toluene; GC/NPD; III [#2501]

7353
000039

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Repeat	NIOSH	Inh	Asphy; nau, vomit; chest	Eye:	*Irr immed*	*Kidneys, liver,*
Goggles:	Reason prob	*200 ppm: CCROV/SA/SCBA*	Abs	pain; weak; stupor,	Skin:	Water flush immed	CVS, CNS, lungs,
Wash:	Immed contam	500 ppm: SA:CF/PAPROV	Ing	convuls; eye irrit	Breath:	Resp support	skin, eyes
Change:	N.R.	1000 ppm: GMFOV/SCBAF/SAF/	Con		Swallow:	Medical attention	
Remove:	Immed wet (flamm)	CCRFOV				immed	
Provide:	Quick drench	4000 ppm: SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
Clothing:	Any poss	NIOSH	Inh	Reduced function of	Eye:	Irr immed	Liver, bladder,
Goggles:	Any poss	¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	liver, kidneys, bladder,	Skin:	Soap wash immed	kidneys,
Wash:	Immed contam/daily	Escape: HiEF/SCBAE	Ing	pancreas, [carc]	Breath:	Resp support	pancreas, skin,
Change:	After work if *any poss*		Con		Swallow:	Medical attention	lungs
	contam					immed	
Remove:	Immed contam						
Provide:	*Eyewash*, quick drench						
Clothing:	*Repeat*	OSHA	Inh	Irrit eyes, nose; anor,	Eye:	Irr immed	Eyes, upper resp
Goggles:	Reason prob	10 ppm: SA/SCBA	Ing	nau; severe head; abdom	Skin:	Water flush prompt	sys, liver
Wash:	Prompt contam	§: *SCBAF:PD,PP/SAF:PD,PP:ASCBA*	Con	pain; jaun; monocy	Breath:	Resp support	
Change:	N.R.	Escape: GMFOV/SCBAE			Swallow:	Medical attention	
Remove:	Prompt non-imperv					immed	
	contam						
Clothing:	Any poss	NIOSH/OSHA	Inh	Irrit eyes, skin, muc	Eye:	*Irr immed*	*Heart, eyes,*
Goggles:	Any poss	*2.5 ppm: SA:CF*/PAPROV**	Ing	memb; abnormal pulm	Skin:	Water flush immed	skin, resp sys
Wash:	Immed contam	5 ppm: CCRFOV/GMFOV/SCBAF/SAF	Con	func; delayed pulm	Breath:	Resp support	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		edema; chronic resp	Swallow:	*Medical attention*	
Remove:	Immed wet (flamm)	*Escape: GMFOV/SCBAE*		disease		immed	
Provide:	Eyewash, quick drench						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Acrylamide CH_2=CHCONH$_2$ 79-06-1 AS3325000 2074 55	Acrylamide monomer, Acrylic amide, Propenamide, 2-Propenamide	NIOSH Ca See Appendix A 0.03 mg/m³ [skin] OSHA 0.03 mg/m³ [skin]	Ca [Unknown] ACGIH A2	White crystalline, odorless solid.	MW: 71.1 BP: 347-572°F (Decomposes) Sol(86°F): 216% Fl.P: 280°F IP: ? Sp.Gr(86°F): 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]
Acrylonitrile CH_2=CHCN 107-13-1 AT5250000 1093 30 (inhibited)	Acrylonitrile monomer, AN, Cyanoethylene, Propenenitrile, 2-Propenenitrile, VCN, Vinyl cyanide 1 ppm = 2.21 mg/m³	NIOSH Ca See Appendix A 1 ppm C 10 ppm [15-min] [skin] OSHA [1910.1045] 2 ppm C 10 ppm [15-min] [skin]	Ca [500 ppm] ACGIH A2	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; III [#1604]
Aldrin $C_{12}H_8Cl_6$ 309-00-2 IO2100000 2761 55	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo,exo-1,4:5,8-dimethanonaphthalene; HHDN; Octalene	NIOSH Ca See Appendix A 0.25 mg/m³ [skin] OSHA 0.25 mg/m³ [skin]	Ca [100 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]
Allyl alcohol CH_2=CHCH$_2$OH 107-18-6 BA5075000 1098 28	AA, Allylic alcohol, 1-Propene-3-ol, Propenol, 2-Propenol, Vinyl carbinol 1 ppm = 2.42 mg/m³	NIOSH/OSHA 2 ppm (5 mg/m³) ST 4 ppm (10 mg/m³) [skin]	150 ppm	Colorless liquid with a pungent, mustard-like odor.	MW: 58.1 BP: 205°F Sol: Miscible Fl.P: 70°F IP: 9.63 eV 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	Char; 2-Propanol/ CS_2; GC/FID; III [#1402; Alcohols III]

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Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Ataxia, numb limbs, pares; musc weak; absent deep tendon reflex; hand sweat; ftg, lethargy; irrit eyes, skin; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		CNS, PNS, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed wet (flamm) Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Asphy; irrit eyes; head; sneezing; nau, vomit; weak, li-head; skin vesic; scaling derm; [carc]	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed		CVS, liver, kidneys, CNS, skin, brain tumor, lung and bowel cancer
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: 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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Cancer, CNS, liver, kidneys, skin
Clothing: Any poss liq/Repeat vap >25 ppm Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Quick drench	NIOSH/OSHA 50 ppm: SA:CF*/PAPROV* 100 ppm: CCRFOV/GMFOV/SCBAF/SAF/PAPRTOV* 150 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing	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

35

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Allyl alcohol

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: 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)
Allyl chloride CH_2=$CHCH_2Cl$ 107-05-1 UC7350000 1100 28	3-Chloropropene, 1-Chloro-2-propene, 3-Chloropropylene 1 ppm = 3.18 mg/m³	NIOSH/OSHA 1 ppm (3 mg/m³) ST 2 ppm (6 mg/m³)	300 ppm	Colorless, brown, yellow, or purple liquid with a pungent, unpleasant odor.	MW: 76.5 BP: 113°F Sol: 0.4% Fl.P: -25°F IP: 10.05 eV 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; III [#1000]
Allyl glycidyl ether $C_6H_{10}O_2$ 106-92-3 RR0875000 2219 29	AGE; 1-Allyloxy-2,3-epoxypropane; Glycidyl allyl ether; [(2-Propenyloxy)methyl] -oxirane 1 ppm = 4.75 mg/m³	NIOSH 5 ppm (22 mg/m³) ST 10 ppm (44 mg/m³) [skin] OSHA 5 ppm (22 mg/m³) ST 10 ppm (44 mg/m³)	270 ppm	Colorless liquid with a pleasant odor.	MW: 114.2 BP: 309°F Sol: 14% Fl.P: 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; II(4) [#S346]
4-Aminodiphenyl $C_6H_5C_6H_4NH_2$ 92-67-1 DU8925000	4-Aminobiphenyl, p-Aminobiphenyl, p-Aminodiphenyl, Biphenylamine, 4-Phenylaniline	NIOSH Ca See Appendix A OSHA [1910.1011] See Appendix B ACGIH A1 [skin]	Ca	Colorless crystals with a floral odor. [Note: Turns purple on contact with air.]	MW: 169.2 BP: 576°F Sol: Slight Fl.P: ? IP: ? Sp.Gr: 1.16 Combustible Solid, but must be preheated before ignition possible.	VP(227°F): 1 mm MLT: 127°F UEL: ? LEL: ?	None reported	Filter/-; Si gel; 2-Propanol; GC/FID; II(4) [P&CAM #269]
2-Aminopyridine $NH_2C_5H_4N$ 504-29-0 US1575000 2671 55	alpha-Aminopyridine, alpha-Pyridylamine 1 ppm = 3.91 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% Fl.P: 154°F IP: 8.00 eV Combustible Solid	VP: Low MLT: 137°F UEL: ? LEL: ?	Strong oxidizers	Tenax GC(2); Thermal desorp; GC/FID; II(4) [#S158]

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Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Quick drench	NIOSH/OSHA 25 ppm: SA:CF* 50 ppm: SCBAF/SAF 300 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, skin; pulm edema; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, skin, eyes, liver, kidneys
Clothing: Reason prob Goggles: Any poss Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 50 ppm: SA/SCBA/CCROV 125 ppm: SA:CF*/PAPROV* 250 ppm: GMFOV/SCBAF/SAF/CCRFOV/SAT:CF 270 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Derm; eye, nose irrit; pulm irrit, edema; narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, dizz; lethargy, dysp; ataxia, weak; methemoglobinemia; urinary burning; acute hemorrhagic cystitis; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Bladder, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 5 ppm: SA*/SCBA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Head, dizz; excitement; nau; high BP; resp distress; weak; convuls; stupor	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CNS, 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		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Ammonia NH_3 7664-41-7 BO0875000 2672 60 (12-44% soln) 2073 15 (44% soln) 1005 15 (anhydrous)	Anhydrous ammonia, Aqua ammonia, Aqueous ammonia 1 ppm = 0.71 mg/m³	NIOSH 25 ppm (18 mg/m³) ST 35 ppm (27 mg/m³) OSHA ST 35 ppm (27 mg/m³)	500 ppm	Colorless gas with a pungent, suffocating odor. [Note: Often used in an aqueous solution. Easily liquefied under pressure.]	MW: 17.0 BP: -28°F Sol: 34% Fl.P: NA (Gas) IP: 10.18 eV Combustible Gas, but difficult to burn.	VP: >1 atm FRZ: -108°F UEL: 28% LEL: 15%	Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces.]	Passive sampler; none; IC; III [#6701]
Ammonium sulfamate $NH_4SO_3NH_2$ 7773-06-0 WO6125000 9089 31	Ammate® herbicide, Ammonium aminosulfonate, Monoammonium salt of sulfamic acid, Sulfamate	NIOSH/OSHA 10 mg/m³ (total) 5 mg/m³ (resp)	5000 mg/m³	Colorless to white crystalline, odorless solid. [herbicide]	MW: 114.1 BP: 320°F (Decomposes) Sol: 200% Fl.P: NA IP: ? Noncombustible Solid	VP: Low 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 26	Amyl acetic ester, Amyl acetic ether, 1-Pentanol acetate, Pentyl ester of acetic acid, Primary amyl acetate 1 ppm = 5.41 mg/m³	NIOSH/OSHA 100 ppm (525 mg/m³)	4000 ppm	Colorless liquid with a persistent banana-like odor.	MW: 130.2 BP: 301°F Sol: 0.2% Fl.P: 77°F IP: ? Sp.Gr: 0.88 Class IC Flammable Liquid	VP(77°F): 5 mm FRZ: -95°F UEL: 7.5% LEL: 1.1%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
sec-Amyl acetate $CH_3COOCH(CH_3)C_3H_7$ 626-38-0 AJ2100000 1104 26	1-Methylbutyl acetate, 2-Pentanol acetate, 2-Pentyl ester of acetic acid 1 ppm = 5.41 mg/m³	NIOSH/OSHA 125 ppm (650 mg/m³)	9000 ppm	Colorless liquid with a mild odor.	MW: 130.2 BP: 249°F Sol: Slight Fl.P: 89°F IP: ? Sp.Gr: 0.87 Class IC Flammable Liquid	VP: 7 mm FRZ: -148°F UEL: ? LEL: ?	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]

7353
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Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss >10%/Repeat <10% Goggles: Any poss Wash: Immed contam >10%/ Prompt wet <10% Change: N.R. Remove: Immed non-imperv >10%/ Prompt non-imperv contam <10% Provide: Eyewash 10%, quick drench >10%	NIOSH 250 ppm: CCRS*/SA*/SCBA* 500 ppm: PAPRS*/SCBAF/SAF/ GMFS/CCRFS/SA:CF* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Eye, nose, throat irrit; dysp, bronspas, chest pain; pulm edema; pink frothy sputum; skin burns, vesic	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 50 mg/m³: DM 100 mg/m³: DMXSQ/SA 250 mg/m³: PAPRDM/SA:CF 500 mg/m³: HiEF/PAPRTHiE/ SAT:CF/SCBAF/SAF 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, difficult breath	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Upper resp sys, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCROV*/SA*/ SCBA* 2500 ppm: SA:CF* 4000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; narco; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCROV* 1250 ppm: SA*/SCBA* 3125 ppm: SA:CF* 6250 ppm: GMFOV/SCBAF/SAF 9000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; narco; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin

sec-Amyl acetate

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Aniline and homologs $C_6H_5NH_2$ 62-53-3 BW6650000 1547 57	Aminobenzene, Aniline oil, Benzenamine, Phenylamine 1 ppm = 3.87 mg/m³	NIOSH Ca See Appendix A 2 ppm (8 mg/m³) [skin] OSHA 2 ppm (8 mg/m³) [skin]	Ca [100 ppm]	Colorless to brown oily liquid with an aromatic amine-like odor. [Note: A solid below 21°F.]	MW: 93.1 BP: 363°F Sol: 4% Fl.P: 158°F IP: 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	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
Anisidine (o-, p-isomers) $NH_2C_6H_4OCH_3$ o: 90-04-0 BZ5410000 p: 104-94-9 BZ5450000 2431 55	o: ortho-Aminoanisole, 2-Anisidine, o-Methoxyaniline p: para-Aminoanisole, 4-Anisidine, p-Methoxyaniline 1 ppm = 5.12 mg/m³	NIOSH Ca See Appendix A 0.5 mg/m³ [skin] OSHA 0.5 mg/m³ [skin]	Ca [50 mg/m³]	o: Red or yellow oily liquid with an amine-like odor. [Note: A solid below 41°F.] p: Yellow to brown crystalline solid with an amine-like odor.	MW: 123.2 BP: 437/475°F Sol: Insoluble/ Moderate Fl.P: 244(oc)/ 86°F IP: 7.44 eV Sp.Gr: 1.10/1.07 o: Class IIIB Combustible Liquid p: Combustible Solid	VP: <0.1/ <0.1 mm FRZ/MLT: 41/135°F UEL: ?/? LEL: ?/?	Strong oxidizers	XAD-2; Methanol; HPLC/UVD; III [#2514]
Antimony and compounds (as Sb) Sb 7440-36-0 (Metal) CC4025000 (Metal) 2871 53 (Sb powder)	Metal: Antimony powder, Stibium Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 0.5 mg/m³	80 mg/m³	Metal: Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark gray, lustrous powder.	MW: 121.8 BP: 2975°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 6.69 Metal: 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; AA; II(4) [P&CAM #261]
ANTU $C_{10}H_7NHC(NH_2)S$ 86-88-4 YT9275000 1651 53	alpha-Naphthyl thiocarbamide, 1-Naphthyl thiourea, alpha-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% Fl.P: NA IP: ? Noncombustible Solid	VP: Low MLT: 388°F UEL: NA LEL: NA	Strong oxidizers, silver nitrate	Filter; Methanol; HPLC/UVD; II(5) [#S276]

000047

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; weak, dizz; cyan; ataxia; dysp on effort; tacar; eye irrit; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Blood, CVS, liver, kidneys
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Head, dizz; cyan; RBC Heinz bodies; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Blood, kidneys, liver, CVS
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 5 mg/m³: DMXSQ^/SA/SCBA 12.5 mg/m³: PAPRDM^/SA:CF 25 mg/m³: HiEF/PAPRTHIE/SAT:CF/SCBAF/SAF 80 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit nose, throat, mouth; cough; dizz; head; nau, vomit, diarr; stomach cramps; insom; anor; irrit skin; unable to smell properly; cardiac abnormalities in antimony trichloride exposures	Skin: Breath: Resp support Swallow: Medical attention immed	Resp sys, CVS, skin, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: After work if reason prob contam Remove: N.R.	NIOSH/OSHA 3 mg/m³: CCROVDMFu/SA/SCBA 7.5 mg/m³: PAPROVDMFu/SA:CF 15 mg/m³: CCRFOVHIE/PAPRTOVHIE/SAT:CF/SCBAF/SAF/GMFOVHIE 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; mild liver damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Resp sys

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41

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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)
Arsenic (inorganic compounds as As) As 7440-38-2 (Metal) CG0525000 (Metal) 1558 53 (Metal)	Metal: Arsenia Synonyms of other compounds vary depending upon the specific compound. [Note: OSHA considers "inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except ARSINE.]	NIOSH Ca See Appendix A C 0.002 mg/m³ [15-min] OSHA [1910.1018] 0.010 mg/m³	Ca [100 mg/m³]	Metal: Silver-gray or tin-white, brittle, odorless solid.	MW: 74.9 BP: Sublimes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 5.73 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; AA; III [#7900]
Arsine AsH_3 7784-42-1 CG6475000 2188 18	Arsenic hydride, Arsenic trihydride, Arseniuretted hydrogen, Arsenious hydride, Hydrogen arsenide 1 ppm = 3.24 mg/m³	NIOSH Ca See Appendix A C 0.002 mg/m³ [15-min] OSHA 0.05 ppm (0.2 mg/m³)	Ca [6 ppm]	Colorless gas with a mild garlic-like odor.	MW: 78.0 BP: -81°F Sol: 20% Fl.P: NA (Gas) IP: 9.89 eV Flammable Gas	VP: >1 atm FRZ: -179°F UEL: ? LEL: ?	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; HGA; III [#6001]
Asbestos Hydrated mineral silicates 1332-21-4 CI6475000 2212 31 (blue) 2590 31 (white)	Actinolite, Amosite (cummingtonite-grunerite), Anthophyllite, Chrysotile, Crocidolite, Tremolite	NIOSH Ca See Appendix A See Appendix C OSHA [1910.1001] OSHA [1910.1101] See Appendix C ACGIH See Appendix C	Ca	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids.	MW: Varies BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA Noncombustible Solid	VP: 0 mm (approx) MLT: 1112°F (Decomposes) UEL: NA LEL: NA	None reported [Note: Measurements may also be made with transmission electron microscopy using NIOSH #7402.]	Filter; Acetone/ Triacetin; PCM; III [#7400, Fibers]
Azinphos-methyl $C_{10}H_{12}O_3PS_2N_3$ 86-50-0 TE1925000 2783 55	Guthion®; 0,0-Dimethyl-S-4-oxo-1,2,3-benzotriazin-3(4H)-ylmethyl phosphorodithioate; Methyl azinphos $[(CH_3O)_2P(S)SCH_2(N_3C_7H_4O)]$	NIOSH/OSHA 0.2 mg/m³ [skin]	20 mg/m³	Colorless crystals or a brown, waxy solid. [insecticide]	MW: 317.3 BP: Decomposes Sol: 0.003% Fl.P: NA IP: ? Sp.Gr: 1.44 Noncombustible Solid	VP: Low MLT: 163°F UEL: NA LEL: NA	Strong oxidizers, acids	None available

000049

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if reason prob contam Remove: Immed contam Provide: Eyewash, quick drench	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: Irr immed (15 min) Skin: Soap wash immed Swallow: Medical attention immed	Liver, kidneys, skin, lungs, lymphatic sys
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head, malaise, weak, dizz; dysp; abdom and back pain; nau, vomit; bronze skin; hema; jaun; peri neur; [carc]	Breath: Resp support	Blood, kidneys, liver
Clothing: Any poss Goggles: Reason prob Wash: Daily Change: After work if reason prob contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing	Dysp, interstitial fib, restricted pulm function, finger clubbing, [carc]	Eye: Irr immed	Lungs
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 2 mg/m³: SA/SCBA/CCROVDMFu 5 mg/m³: PAPROVDMFu/SA:CF 10 mg/m³: CCRFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF/GMFOVHIE 20 mg/m³: SA:PD,PP §: 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 irregularities	*Eye: Irr immed* Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	*Resp sys, CNS,* CVS, blood chol
Azinphos-methyl					

7353

000050

Chemical name, structure/formula, CAS and RTECS Nos., and 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	Measuremont method (See Table 1)
Barium (soluble compounds as Ba) 1: $Ba(NO_3)_2$ 2: $BaCl_2$ 1: 10022-31-8/ CQ9625000 2: 10361-37-2/ CQ8750000 1446 42 (Barium nitrate)	1: Barium nitrate, Barium dinitrate 2: Barium chloride, Barium dichloride Synonyms of other soluble compounds vary depending upon the specific compound.	NIOSH/OSHA 0.5 mg/m³	1100 mg/m³	Barium nitrate & Barium chloride are white odorless solids.	MW: 261.4/ 208.3 BP: Decomposes /2840°F Sol: 9/38% Fl.P: NA/? IP: ?/? Sp.Gr: 3.24/3.86 $Ba(NO_3)_2$: Noncombustible Solid $BaCl_2$: Combustible Solid	VP: Low/Low MLT: 1098/ 1765°F UEL: NA/? LEL: NA/?	Acids, oxidizers [Note: Contact of barium nitrate with combustible material may cause fire.]	Filter; Water; AA; III [#7056]
Benzene C_6H_6 71-43-2 CY1400000 1114 27	Benzol, Phenyl hydride 1 ppm = 3.25 mg/m³	NIOSH Ca See Appendix A 0.1 ppm ST 1 ppm OSHA [1910.1028] 1 ppm ST 5 ppm	Ca [3000 ppm] ACGIH A2	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: 7.9% LEL: 1.3%	Strong oxidizers, many fluorides & perchlorates, nitric acid [Note: Measurements may also be made with a portable GC using NIOSH #3700 (III).]	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
Benzidine $NH_2C_6H_4C_6H_4NH_2$ 92-87-5 DC9625000 1885 53	4,4'-Bianiline; 4,4'-Biphenyldiamine; 1,1'-Biphenyl-4,4'-diamine; 4,4'-Diaminobiphenyl; p-Diaminodiphenyl	NIOSH Ca See Appendix A OSHA [1910.1010] See Appendix B ACGIH A1 [skin]	Ca	Grayish-yellow, reddish-gray, or white crystalline powder.	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: ?	None reported	Filter/ Si gel; Reagent; HPLC/UVD; III [#5509]
Benzoyl peroxide $(C_6H_5CO)_2O_2$ 94-36-0 DM8575000 2085/2086/2087 49 2088/2089/2090 49	Benzoperoxide, Dibenzoyl peroxide	NIOSH/OSHA 5 mg/m³	7000 mg/m³	Colorless to white crystals or a granular powder with a faint benzaldehyde-like odor.	MW: 242.2 BP: ? Sol: <1% Fl.P: ? IP: ? Sp.Gr(77°F): 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; III [#5009]

000051

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum 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 5 mg/m³: DMXSQ/SA/SCBA 12.5 mg/m³: PAPRDM/SA:CF 25 mg/m³: HIEF/PAPRTHIE/SAT:CF/SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Upper resp irrit; gastroenteritis; musc spasm; slow pulse, extrasystoles; hypokalemia; irrit eyes, skin; skin burns	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Heart, CNS, skin, resp sys, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wash soap Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, resp sys; gidd; head, nau, staggered gait; fig, anor, lass; derm; bone marrow depres; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Blood, CNS, skin, bone marrow, eyes, resp sys
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Hema; secondary anemia from hemolysis; acute cystitis; acute liver disorders; derm; painful and irregular urination; [carc]	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Resp support Medical attention immed	Bladder, kidneys, liver, skin, blood
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: DMXSQ*/SA*/SCBA* 125 mg/m³: PAPRDM*/SA:CF* 250 mg/m³: HIEF/SCBAF/SAF/PAPRTHIE* 7000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit skin, eyes, muc memb; sens derm	Eye: Skin: Swallow:	Irr immed Soap wash prompt Medical attention immed	Skin, resp sys, eyes

Benzoyl peroxide

7353

000052

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Benzyl chloride $C_6H_5CH_2Cl$ 100-44-7 XS8925000 1738 59	Chloromethylbenzene, alpha-Chlorotoluene 1 ppm = 5.26 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% Fl.P: 153°F IP: ? Sp.Gr: 1.10 Class IIIA Combustible Liquid	VP(72°F): 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_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
Beryllium and compounds (as Be) Be 7440-41-7 DS1750000 1566 53 (cmpds) 1567 32 (powder)	Metal: None Synonyms of other compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A Not to exceed 0.0005 mg/m³ OSHA 0.002 mg/m³ C 0.005 mg/m³ 0.025 mg/m³ [30-min maximum peak]	Ca [10 mg/m³] ACGIH A2	Metal: A hard, brittle, gray-white solid.	MW: 9.0 BP: 4532°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 1.85 Metal: 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; HGA; III [#7102]
Boron oxide B_2O_3 1303-86-2 ED7900000	Boric anhydride, Boric oxide, Boron trioxide	NIOSH/OSHA 10 mg/m³	N.E.	Colorless, semi-transparent lumps or hard, white, odorless crystals.	MW: 69.6 BP: 3380°F Sol: 3% Fl.P: NA IP: NA Sp.Gr: 2.46 Noncombustible Solid	VP: 0 mm (approx) MLT: 842°F UEL: NA LEL: NA	Water [Note: Reacts slowly with water to form boric acid.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Boron trifluoride BF_3 7637-07-2 ED2275000 1008 15	Boron fluoride, Trifluoroborane 1 ppm = 2.82 mg/m³	NIOSH/OSHA C 1 ppm (3 mg/m³)	100 ppm	Colorless gas with a pungent, suffocating odor. [Note: Forms dense white fumes in moist air.]	MW: 67.8 BP: -148°F Sol: 106% (in cold H_2O) Fl.P: NA IP: 15.50 eV Nonflammable Gas	VP: >1 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, and fluoboric acid.]	None available

000053

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: SA*/PAPROVAG*/ CCROVAG*/GMFOVAG/SCBA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVAG/SCBAE	Inh Ing Con	Irrit eyes, nose; weak; irrity; head; skin eruption; pulm edema	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, skin
Clothing: Repeat Goggles: Any poss Wash: Daily Change: After work if any poss contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Resp symptoms, weak, ftg, weight loss, [carc]	Eye:	Irr immed	Lungs, skin, eyes, muc memb
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: DM* 100 mg/m³: DMXSQ^*/SA*/SCBA* 250 mg/m³: PAPRDM^*/SA:CF* 500 mg/m³: SCBAF/SAF/HiEF/ PAPRTHiE* 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Nasal irrit, conj, erythema	Eye: Irr immed Skin: Water flush prompt Breath: Fresh air Swallow: Medical attention immed		Skin, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 10 ppm: SA*/SCBA* 25 ppm: SA:CF* 50 ppm: SCBAF/SAF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Nasal irrit, epis; burns eyes, skin; in animals: pneu; kidney damage; epis	Eye: Irr immed Skin: Water flush immed Breath: Resp support		Resp sys, kidneys, eyes, skin

Boron trifluoride

D-7353

000054

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Bromine Br_2 7726-95-6 EF9100000 1744 59	Molecular bromine 1 ppm = 6.64 mg/m³	NIOSH/OSHA 0.1 ppm (0.7 mg/m³) ST 0.3 ppm (2 mg/m³)	10 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.]	Bub; none; IC; OSHA [#ID108]
Bromoform $CHBr_3$ 75-25-2 PB5600000 2515 58	Methyl tribromide, Tribromomethane 1 ppm = 10.51 mg/m³	NIOSH/OSHA 0.5 ppm (5 mg/m³) [skin]	Unknown	Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.]	MW: 252.8 BP: 301°F Sol: 0.1% Fl.P: NA IP: 10.48 eV 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; III [#1003, Halogenated Hydrocarbons]
1,3-Butadiene CH_2=CHCH=CH_2 106-99-0 EI9275000 1010 17 (inhibited)	Biethylene, Bivinyl, Butadiene, Divinyl, Erythrene, Vinylethylene 1 ppm = 2.25 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 1000 ppm (2200 mg/m³)	Ca [20,000 ppm] [LEL] ACGIH A2, 10 ppm (22 mg/m³)	Colorless gas with a mild aromatic or gasoline-like odor. [Note: A liquid below 24°F.]	MW: 54.1 BP: 24°F Sol: Insoluble Fl.P: NA (Gas) <0°F (Liquid) IP: 9.07 eV Sp.Gr: 0.65(Liquid at 24°F) Flammable Gas Class IA Flammable Liquid	VP: >1 atm FRZ: -164°F UEL: 12.0% LEL: 2.0%	Phenol, chlorine dioxide, copper, crotonaldehyde [Note: May contain inhibitors (such as tri-butylcatechol) to prevent self-polymerization. May form explosive peroxides upon exposure to air.]	Char(2); CH_2Cl_2; GC/FID; III [#1024]
2-Butanone $CH_3COCH_2CH_3$ 78-93-3 EL6475000 1193/1232 26	Ethyl methyl ketone, MEK, Methyl acetone, Methyl ethyl ketone 1 ppm = 3.00 mg/m³	NIOSH/OSHA 200 ppm (590 mg/m³) ST 300 ppm (885 mg/m³)	3000 ppm	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor.	MW: 72.1 BP: 175°F Sol: 28% Fl.P: 16°F IP: 9.54 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 71 mm FRZ: -123°F UEL(200°F): 11.4% LEL(200°F): 1.4%	Strong oxidizers, amines, ammonia, inorganic acids, caustics, copper, isocyanates, pyridines	Ambersorb; CS_2; GC/FID; III [#2500]

000055

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)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed contam Provide: Eyewash, quick drench	NIOSH/OSHA 2.5 ppm: SA:CF$^{\varepsilon}$/PAPRS$^{\iota\varepsilon}$ 5 ppm: CCRFS$^{\iota}$/GMFS$^{\iota}$/SCBAF/SAF PAPRTS$^{\iota\varepsilon}$ 10 ppm: SAF:PD,PP §: 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; severe burns eyes, skin	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 12.5 ppm: SA:CF$^{\varepsilon}$/PAPROV$^{\varepsilon}$ 25 ppm: CCRFOV/GMFOV/SCBAF/SAF/PAPRTOV$^{\varepsilon}$ 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing	Irrit eyes, resp sys; CNS depression; liver damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, liver, kidneys, resp sys, CNS
Clothing: Prevent skin freezing Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, throat; drow, li-head; frostbite; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support	Eyes, resp sys, CNS
Clothing: Repeat Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 1000 ppm: PAPROV$^{\varepsilon}$/CCRFOV 3000 ppm: GMFOV/SA:CF$^{\varepsilon}$/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; head; dizz; vomit	Eye: Irr immed Skin: Water wash immed Breath: Fresh air Swallow: Medical attention immed	CNS, lungs

7353

000056

2-Butanone

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
2-Butoxyethanol $C_4H_9OCH_2CH_2OH$ 111-76-2 KJ8575000 2369 26	Butyl cellosolve, Butyl oxitol, Dowanol EB, Ektasolve EB, Ethylene glycol monobutyl ether, Jeffersol EB 1 ppm = 4.91 mg/m³	NIOSH/OSHA 25 ppm (120 mg/m³) [skin]	700 ppm	Colorless mobile liquid with a mild ether-like odor.	MW: 118.2 BP: 339°F Sol: Miscible Fl.P: 143°F IP: ? 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; III [#1403, Alcohols IV]
n-Butyl acetate $CH_3COO[CH_2]_3CH_3$ 123-86-4 AF7350000 1123 26	Butyl acetate, n-Butyl ester of acetic acid, Butyl ethanoate 1 ppm = 4.83 mg/m³	NIOSH/OSHA 150 ppm (710 mg/m³) ST 200 ppm (950 mg/m³)	10,000 ppm	Colorless liquid with a fruity odor.	MW: 116.2 BP: 258°F Sol: 1% Fl.P: 72°F IP: 10.00 eV Sp.Gr: 0.88 Class IC Flammable Liquid	VP(77°F): 15 mm FRZ: -107°F UEL: 7.6% LEL: 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
sec-Butyl acetate $CH_3COOCH(CH_3)$-CH_2CH_3 105-46-4 AF7380000 1123 26	sec-Butyl ester of acetic acid, 1-Methylpropyl acetate 1 ppm = 4.83 mg/m³	NIOSH/OSHA 200 ppm (950 mg/m³)	10,000 ppm	Colorless liquid with a pleasant, fruity odor.	MW: 116.2 BP: 234°F Sol: 0.8% Fl.P: 62°F IP: 9.91 eV Sp.Gr: 0.86 Class IB Flammable Liquid	VP(77°F): 24 mm FRZ: -100°F UEL: 9.8% LEL: 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
tert-Butyl acetate $CH_3COOC(CH_3)_3$ 540-88-5 AF7400000 1123 26	tert-Butyl ester of acetic acid 1 ppm = 4.83 mg/m³	NIOSH/OSHA 200 ppm (950 mg/m³)	10,000 ppm	Colorless liquid with a fruity odor.	MW: 116.2 BP: 208°F Sol: Insoluble Fl.P: 62-72°F IP: ? Sp.Gr: 0.87 Class IB Flammable Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]

000057

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	Repeat Reason prob Immed contam N.R. Immed non-imperv contam Quick drench	NIOSH/OSHA 250 ppm: SA*/SCBA* 625 ppm: PAPROV*/SA:CF* 700 ppm: GMFOV/CCRFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; hemolysis, hemog	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Liver, kidneys, lymphoid sys, skin, blood, eyes, resp sys
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCROV* 1500 ppm: SA*/SCBA* 3750 ppm: SA:CF* 7500 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; drow; dryness and irrit eyes, upper resp sys, skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[ε]/CCROV 5000 ppm: SA:CF[ε] 10,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes; head; drow; dryness upper resp sys, skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[ε]/CCRFOV 5000 ppm: SA:CF[ε] 10,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Itch, inflamm eyes; irrit upper resp tract; head; narco; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, eyes, skin

tert-Butyl acetate

7353

000058

Chemical name, structure/formula, CAS and RTECS Nos., and 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 alcohol $CH_3CH_2CH_2CH_2OH$ 71-36-3 EO1400000 1120 26	1-Butanol, n-Butanol, Butyl alcohol, 1-Hydroxybutane, n-Propyl carbinol 1 ppm = 3.08 mg/m³	NIOSH/OSHA C 50 ppm (150 mg/m³) [skin]	8000 ppm	Colorless liquid with a strong, characteristic, mildly alcoholic odor.	MW: 74.1 BP: 243°F Sol: 9% Fl.P: 99°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	Char; 2-Propanol/ CS_2; GC/FID; III [#1401, Alcohols II]
sec-Butyl alcohol $CH_3CHOHCH_2CH_3$ 78-92-2 EO1750000 1120 26	2-Butanol, Butylene hydrate, 2-Hydroxybutane, Methyl ethyl carbinol 1 ppm = 3.08 mg/m³	NIOSH 100 ppm (305 mg/m³) ST 150 ppm (455 mg/m³) OSHA 100 ppm (305 mg/m³)	10,000 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(86°F): 24 mm FRZ: -175°F UEL(212°F): 9.8% LEL(212°F): 1.7%	Strong oxidizers	Char; 2-Propanol/ CS_2; GC/FID; III [#1401, Alcohols II]
tert-Butyl alcohol $(CH_3)_3COH$ 75-65-0 EO1925000 1120 26	2-Methyl-2-propanol, Trimethyl carbinol 1 ppm = 3.08 mg/m³	NIOSH/OSHA 100 ppm (300 mg/m³) ST 150 ppm (450 mg/m³)	8000 ppm	Colorless solid or liquid with a camphor-like odor. [Note: Pure compound is a liquid above 77°F. 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 Class IB Flammable Liquid	VP(77°F): 42 mm FRZ: 77°F UEL: 8.0% LEL: 2.4%	Strong mineral acids, strong hydrochloric acid, oxidizers	Char; 2-Butanol/ CS_2; GC/FID; III [#1400, Alcohols I]
Butylamine $CH_3CH_2CH_2CH_2NH_2$ 109-73-9 EO2975000 1125 68	1-Aminobutane, n-Butylamine 1 ppm = 3.04 mg/m³	NIOSH/OSHA C 5 ppm (15 mg/m³) [skin]	2000 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 IA 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; II(4) [#S138]

000059

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[t]/CCRFOV 1250 ppm: SA:CF[t] 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP §: SCBAF:PD;PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, verti, drow; corneal inflamm, blurred vision, lac, photo; dry cracked skin	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Skin, eyes, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCRFOV/SA*/SCBA* 2500 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Eye irrit, narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[t]/CCRFOV 2500 ppm: SA:CF[t] 5000 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Drow; irrit skin, eyes	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH/OSHA 50 ppm: SA*/SCBA*/CCRS* 125 ppm: SA:CF*/PAPRS* 250 ppm: CCRFS/GMFS/SCBAF/SAF/PAPRTS* 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head; skin flush, burns	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes
Butylamine						

7353

53

000060

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
tert-Butyl chromate (as CrO_3) $((CH_3)_3CO)_2CrO_2$ 1189-85-1 GB2900000	di-tert-Butyl ester of chromic acid 1 ppm = 9.57 mg/m³	NIOSH Ca See Appendix A 0.001 mg/m³ OSHA C 0.1 mg/m³ [skin]	Ca [30 mg/m³]	Liquid. [Note: Solidifies at 32-23°F.]	MW: 230.3 BP: ? Sol: ? Fl.P: ? IP: ?	VP: ? FRZ: 32-23°F UEL: ? LEL: ?	Reducing agents, moisture	None available
n-Butyl glycidyl ether $C_7H_{14}O_2$ 2426-08-6 TX4200000 54	BGE; 1,2-Epoxy-3-butoxypropane 1 ppm = 5.41 mg/m³	NIOSH C 5.6 ppm (30 mg/m³) [15-min] OSHA 25 ppm (135 mg/m³)	3500 ppm	Colorless liquid with an irritating odor.	MW: 130.2 BP: 327°F Sol: 2% Fl.P: 130°F IP: ? Sp.Gr(77°F): 0.91 Class II Combustible Liquid	VP(77°F): 3 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics	Char; CS_2; GC/FID; II(2) [#S81]
Butyl mercaptan $CH_3CH_2CH_2CH_2SH$ 109-79-5 EK6300000 2347 27	Butanethiol, 1-Butanethiol, n-Butanethiol, 1-Mercaptobutane 1 ppm = 3.75 mg/m³	NIOSH C 0.5 ppm (1.8 mg/m³) [15-min] OSHA 0.5 ppm (1.5 mg/m³)	2500 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	Chrom-104; Acetone; GC/FID; II(4) [#S350]
p-tert-Butyltoluene $(CH_3)_3CC_6H_4CH_3$ 98-51-1 XS8400000 2667 27	1-Methyl-4-tert-butylbenzene 1 ppm = 6.16 mg/m³	NIOSH/OSHA 10 ppm (60 mg/m³) ST 20 ppm (120 mg/m³)	1000 ppm	Colorless liquid with a distinct aromatic odor, somewhat like gasoline.	MW: 148.3 BP: 379°F Sol: Insoluble Fl.P: 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; CS_2; GC/FID; III [#1501, Aromatic Hydrocarbons]

000061

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Lung, sinus cancer; [carc]	Eye: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Irr immed	Resp sys, skin, eyes, CNS
Clothing: Any poss Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH 56 ppm: SA*/SCBA*/CCROV* 140 ppm: SA:CF*/PAPROV* 280 ppm: SCBAF/SAF/CCRFOV/GMFOV/PAPRTOV* 3500 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; skin irrit, sens; narco	Eye: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Irr immed	Eyes, skin, resp sys, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 5 ppm: SA/SCBA/CCROV 12.5 ppm: SA:CF/PAPROV 25 ppm: SCBAF/SAF/CCRFOV/PAPRTOV/GMFOV 500 ppm: SA:PD:PP* 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: narco, inco, weak; cyan, pulm irrit; liver, kidney damage	Eye: Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Irr immed	Resp sys; In animals: CNS, liver, kidneys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 250 ppm: SA:CF£/PAPROV£ 500 ppm: CCRFOV/GMFOV/SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin; dry nose, throat; head; low BP, tacar, abnormal cardiovascular stress; CNS depres; hemato depres	Eye: Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Irr immed	CVS, CNS, skin, bone marrow, eyes, upper resp sys

p-tert-Butyltoluene

7353

000062

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Cadmium dust (as Cd) Cd 7440-43-9 EU9800000 2570 53	Metal: none Synonyms of other compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 0.2 mg/m³ C 0.6 mg/m³	Ca [50 mg/m³]	Metal: Silver-white, blue-tinged lustrous, odorless solid.	MW: 112.4 BP: 1409°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr(77°F): 8.65 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; AA; III [#7048]
Cadmium fume (as Cd) CdO/Cd 1306-19-0 (CdO) EV1930000 (CdO)	CdO: Cadmium monoxide, Cadmium oxide fume Cd: None	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 0.1 mg/m³ C 0.3 mg/m³	Ca [9 mg/m³]	Odorless, yellow-brown, finely divided particulate dispersed in air.	MW: 128.4 BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA [Note: See Cadmium dust for properties of Cd.] 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; AA; III [#7048]
Calcium arsenate (as As) $Ca_3(AsO_4)_2$ 7778-44-1 CG0830000 1573 53	Calcium salt (2:3) of arsenic acid, Cucumber dust, Tricalcium arsenate, Tricalcium ortho-arsenate	NIOSH Ca See Appendix A C 0.002 mg/m³ [15-min] OSHA [1910.1018] 0.010 mg/m³	Ca [100 mg/m³]	Colorless to white, odorless solid. [insecticide/herbicide]	MW: 398.1 BP: Decomposes Sol(77°F): 0.01% Fl.P: NA IP: NA Sp.Gr: 3.62 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported [Note: Produces toxic fumes of arsenic when heated to decomposition.]	Filter; Acid; AA; III [#7900, Arsenic]
Calcium oxide CaO 1305-78-8 EW3100000 1910 60	Burned lime, Burnt lime, Lime, Pebble lime, Quick lime, Unslaked lime	NIOSH 2 mg/m³ OSHA 5 mg/m³	Unknown	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	VP: 0 mm (approx) MLT: 4662°F UEL: NA LEL: NA	Water (liberates heat), fluorine [Note: Reacts with water to form calcium hydroxide.]	Filter; Acid; AA; III [#7020]

000063

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	N.R. Any poss ($CdCl_2$) Daily (reason prob) After work if any poss contam N.R. Eyewash ($CdCl_2$)	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: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Resp sys, kidneys, prostate, blood
Clothing: Goggles: Wash: Change: Remove:	N.R. N.R. N.R. N.R. N.R.	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
Clothing: Goggles: Wash: Change: Remove:	Repeat Any poss Prompt contam/daily After work if any poss contam Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Weak; GI dist; peri neur; skin hyperpig, palmar planter hyperkeratoses; derm; [carc]; in animals: liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, liver, skin, lymphatics, CNS
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Any poss Prompt contam/daily After work if reason prob contam Prompt non-imperv contam Eyewash, quick drench	NIOSH 10 mg/m³: DM 20 mg/m³: DMXSQ/SA/SCBA 50 mg/m³: PAPRHiE/SA:CF 100 mg/m³:HiEF/SCBAF/SAF/PAPRTHIE 250 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, upper resp tract; ulcer, perf nasal septum; pneu; derm	Eye: Skin: Breath: Swallow	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, skin, eyes

Calcium oxide

7353

000064

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Camphor (synthetic) $C_{10}H_{16}O$ 76-22-2 EX1225000 2717 32	2-Camphonone, Gum camphor, Laurel camphor, Synthetic camphor	NIOSH/OSHA 2 mg/m³	200 mg/m³	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%	Oxidizers (especially chromic anhydride)	Char; Methanol/ CS_2; GC/FID; II [#1301, Ketones II]
Carbaryl (Sevin®) $C_{10}H_7OOCNHCH_3$ 63-25-2 FC5950000 2757 55	alpha-Naphthyl N-methyl-carbamate, 1-Naphthyl N-Methyl-carbamate	NIOSH/OSHA 5 mg/m³	600 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; III [#5006]
Carbon black C 1333-86-4 FF5800000	Acetylene black, Channel black, Furnace black, Lamp black, Thermal black	NIOSH/OSHA 3.5 mg/m³ NIOSH Ca See Appendix A 0.1 mg/m³ [Carbon black in presence of polycyclic aromatic hydrocarbons]	N.E. Ca	Black, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble Fl.P: ? IP: NA Sp.Gr: 1.8-2.1 Combustible Solid that may contain flammable hydrocarbons.	VP: 0 mm (approx) MLT: Sublimes UEL: ? LEL: ?	Strong oxidizers such as chlorates, bromates & nitrates	Filter; none; Grav; III [#5000]
Carbon dioxide CO_2 124-38-9 FF6400000 1013 12 1845 21 (dry ice) 2187 21 (liquid)	Carbonic acid gas, Dry ice 1 ppm = 1.83 mg/m³	NIOSH 5,000 ppm (9000 mg/m³) ST 30,000 ppm (54,000 mg/m³) OSHA 10,000 ppm (18,000 mg/m³) ST 30,000 ppm (54,000 mg/m³)	50,000 ppm	Colorless, odorless gas. [Note: Normal constituent of air (about 3000 ppm). Solid form is utilized as dry ice.]	MW: 44.0 BP: Sublimes Sol(77°F): 0.2% Fl.P: NA IP: 13.77 eV Noncombustible Gas	VP: >1 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.	Bag; none; GC/FID; II(3) [#S249]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: SA:CF[£]/PAPROVDM[£] 100 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE[£]/SCBAF/SAF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; nau, vomit, diarr; head, dizz, excitement, irrational, epileptiform convuls	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, eye, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: SA*/SCBA* 125 mg/m³: SA:CF* 250 mg/m³: SCBAF/SAF 600 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Miosis, blurred vision, tear; nasal discharge, salv; sweat; abdom cramps, nau, vomit, diarr; tremor; cyan; convuls; skin irrit	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, CNS, CVS, skin
Clothing: N.R. Goggles: Repeat Wash: Daily Change: N.R. Remove: N.R.	NIOSH/OSHA 17.5 mg/m³: DM 35 mg/m³: DMXSQ/SA/SCBA 87.5 mg/m³: PAPRDM/SA:CF 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	None expected; 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		None known
Clothing: Prevent skin freezing Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH 50,000 ppm: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	Head, dizz, restless, pares; dysp; sweat, mal; inc heart rate, pulse pressure; elevated BP; coma; asphy; convuls at high concentrations; frostbite (dry ice)	Eye: Skin: Medical attention for frostbite Breath: Resp support		Lungs, skin, CVS
Carbon dioxide						

7353

59

000066

Chemical name, structure/formula, CAS and RTECS Nos., and 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 disulfide CS_2 75-15-0 FF6650000 1131 28	Carbon bisulfide 1 ppm = 3.16 mg/m³	NIOSH 1 ppm (3 mg/m³) ST 10 ppm (30 mg/m³) [skin] OSHA 4 ppm (12 mg/m³) ST 12 ppm (36 mg/m³) [skin]	500 ppm	Colorless to faint-yellow liquid with a sweet ether-like odor. [Note: Reagent grades are foul smelling.]	MW: 76.1 BP: 116°F Sol: 0.3% Fl.P: -22°F IP: 10.08 eV Sp.Gr: 1.26 Class IB Flammable Liquid	VP: 297 mm FRZ: -169°F UEL: 50.0% LEL: 1.3%	Strong oxidizers; chemically-active metals such as sodium, potassium & zinc; azides; rust; halogens; amines [Note: Vapors may be ignited by contact with ordinary light bulb.]	Char/ Dry tube Toluene; GC/FPD; III [#1600]
Carbon monoxide CO 630-08-0 FG3500000 1016 18	Carbon oxide, Flue gas, Monoxide 1 ppm = 1.16 mg/m³	NIOSH/OSHA 35 ppm (40 mg/m³) C 200 ppm (229 mg/m³) [Note: On 9/5/89 OSHA stayed the start-up date for the Ceiling limit for the following steel industry operations — blast furnaces, vessel blowing at basic oxygen furnaces, and sinter plants.]	1500 ppm	Colorless, odorless gas. [Note: Shipped as a nonliquefied compressed gas.]	MW: 28.0 BP: -313°F Sol: 2% Fl.P: NA (Gas) IP: 14.01 eV Flammable Gas	VP: >1 atm MLT: -337°F UEL: 74% LEL: 12.5%	Strong oxidizers, bromine trifluoride, chlorine trifluoride, lithium	Bag; none; ECA; II(4) [#S340]
Carbon tetrachloride CCl_4 56-23-5 FG4900000 1846 55	Carbon chloride, Carbon tet, Freon® 10, Halon® 104, Tetrachloromethane 1 ppm = 6.39 mg/m³	NIOSH Ca See Appendix A ST 2 ppm (12.6 mg/m³) [60-min] OSHA 2 ppm (12.6 mg/m³)	Ca [300 ppm] ACGIH A2 [skin]	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; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
Chlordane $C_{10}H_6Cl_8$ 57-74-9 PB9800000 2762 28	1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane 1 ppm = 17.04 mg/m³	NIOSH Ca See Appendix A 0.5 mg/m³ [skin] OSHA 0.5 mg/m³ [skin]	Ca [500 mg/m³]	Amber-colored, viscous liquid with a pungent, chlorine-like odor. [insecticide]	MW: 409.8 BP: Decomposes Sol: Insoluble Fl.P: NA IP: ? Sp.Gr(77°F): 1.56 Noncombustible Liquid, but may be utilized in flammable solutions.	VP: 0.00001 mm FRZ: ? UEL: NA LEL: NA	Strong oxidizers, alkaline reagents	Filter/ Chrom-102; Toluene; GC/ECD; III [#5510]

000067

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH 10 ppm: CCROV/SA/SCBA 25 ppm: SA:CF/PAPROV 50 ppm: CCRFOV/PAPRTOV/GMFOV/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 damage; eye, skin burns; derm	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, PNS, CVS, eyes, kidneys, liver, skin
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 350 ppm: SA/SCBA 875 ppm: SA:CF 1500 ppm: SCBAF/SAF/GMFS† §: 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	Breath:	Resp support	CVS, lungs, blood, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	CNS depres; nau, vomit; liver, kidney damage; skin irrit; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, eyes, lungs, liver, kidneys, skin
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Quick drench	OSHA ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/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	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, eyes, lungs, liver, kidneys, skin
Chlordane						

7353

000068

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Chlorinated camphene $C_{10}H_{10}Cl_8$ 8001-35-2 XW5250000 2761 55	Chlorocamphene, Octachlorocamphene, Polychlorocamphene, Toxaphene	NIOSH Ca See Appendix A [skin] OSHA 0.5 mg/m³ ST 1 mg/m³ [skin]	Ca [200 mg/m³]	Amber, waxy solid with a mild chlorine- and camphor-like odor. [Insecticide]	MW: 413.8 BP: Decomposes Sol: 0.0003% Fl.P: 275°F IP: ? Sp.Gr(77°F): 1.65 A Solid that does not burn, or burns with difficulty.	VP(77°F): 0.4 mm MLT: 149 to 194°F UEL: ? LEL: ?	Strong oxidizers [Note: Slightly corrosive to metals under moist conditions.]	Filter; Petroleum ether; GC/ECD; II(2) [#S67]
Chlorinated diphenyl oxide $(C_6H_2Cl_3)_2O$ 55720-99-5 KO0875000 1 ppm = 15.67 mg/m³	Hexachlorodiphenyl oxide, Hexachlorophenyl ether	NIOSH/OSHA 0.5 mg/m³	Unknown	Light yellow, very viscous, waxy liquid.	MW: 376.9 BP: 446-500°F Sol: 0.1% Fl.P: NA IP: ? Sp.Gr: 1.60 Noncombustible Liquid	VP: 0.00006 mm FRZ: ? UEL: NA LEL: NA	Strong oxidizers	Filter; Isooctane; GC/EConD; III [#5025, Chlorinated diphenyl ether]
Chlorine Cl_2 7782-50-5 FO2100000 1017 20 1 ppm = 2.95 mg/m³	Molecular chlorine	NIOSH/OSHA 0.5 ppm (1.5 mg/m³) ST 1 ppm (3 mg/m³)	30 ppm	Greenish-yellow gas with a pungent, irritating odor. [Note: Shipped in steel cylinders.]	MW: 70.9 BP: -29°F Sol: 0.7% Fl.P: NA IP: 11.48 eV Noncombustible Gas, but a strong oxidizer.	VP: >1 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.	Bub; none; ISE; OSHA [#ID101]
Chlorine dioxide ClO_2 10049-04-4 FO3000000 1 ppm = 2.81 mg/m³	Chlorine oxide, Chlorine peroxide	NIOSH/OSHA 0.1 ppm (0.3 mg/m³) ST 0.3 ppm (0.9 mg/m³)	10 ppm	Yellow to red gas or a red-brown liquid (below 52°F) with an unpleasant odor similar to chlorine and nitric acid.	MW: 67.5 BP: 52°F Sol(77°F): 0.3% Fl.P: NA (Gas) ? (Liquid) IP: 10.36 eV Sp.Gr: 1.6 (Liquid at 32°F) Combustible Gas/Liquid	VP: >1 atm FRZ: -74°F UEL: ? LEL: ?	Organic materials, heat, phosphorus, potassium hydroxide, sulfur [Note: Unstable in light. A powerful oxidizer.]	None available

000069

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				Target organs (See Table 5)
		Route	Symptoms (See Table 5)	First aid (See Table 6)		
Clothing: Any poss liq/Repeat sol Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam sol Remove: Prompt non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Nau, conf, agitation, tremors, convuls, unconscious; dry, red skin; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		CNS, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 5 mg/m³: SA/SCBA §: 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
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 5 ppm: CCRS*/SA*/SCBA* 12.5 ppm: SA:CF*/PAPRS* 25 ppm: SCBAF/SAF/GMFS/PAPRTS*/CCRFS 30 ppm: SAF:PD,PP §: 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; eye, skin burns	Eye: Irr immed Skin: Water flush immed Breath: Resp support		Resp sys
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed contam Provide: Eyewash, quick drench	NIOSH/OSHA 1 ppm: CCRS 2.5 ppm: SA:CF‡/PAPRS‡ 5 ppm: CCRFS/GMFS‡/SCBAF/SAF 10 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape GMFS‡/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, wheez, bron, pulm edema; chronic bron	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes

Chlorine dioxide

7353

000070

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Chlorine trifluoride ClF_3 7790-91-2 FO2800000	Chlorine fluoride, Chlorotrifluoride	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.	MW: 92.5 BP: 53°F Sol: Reacts Fl.P: NA IP: 13.00 eV	VP: >1 atm FRZ: -105°F UEL: NA LEL: NA	Oxidizers, water, acids, combustible materials, sand, glass [Note: Reacts with water to form chlorine and hydrofluoric acid.]	None available
1749 44	1 ppm = 3.85 mg/m³				Sp.Gr: 1.77 (Liquid at 53°F) Noncombustible Liquid, but contact with organic materials may result in SPONTANEOUS ignition.			
Chloroacetaldehyde $ClCH_2CHO$ 107-20-0 AB2450000	Chloroacetaldehyde (40% aqueous solution), 2-Chloroacetaldehyde, 2-Chloroethanal	NIOSH/OSHA C 1 ppm (3 mg/m³)	100 ppm	Colorless liquid with an acrid, penetrating odor.	MW: 78.5 BP: 186°F Sol: Miscible Fl.P: 190°F (40% soln) IP: 10.61 eV	VP: 100 mm FRZ: -3°F (40% soln) UEL: ? LEL: ?	Oxidizers, acids	Si gel; Methanol; GC/ECD; II(5) [#S11]
2232 55	1 ppm = 3.26 mg/m³				Sp.Gr: 1.19 Class IIIA Combustible Liquid			
alpha-Chloroaceto-phenone $C_6H_5COCH_2Cl$ 532-27-4 AM6300000	2-Chloroacetophenone, Chloromethyl phenyl ketone, Mace®, Phenacyl chloride, Phenyl chloromethyl ketone, Tear gas	NIOSH/OSHA 0.3 mg/m³ (0.05 ppm)	100 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	VP: 0.01 mm MLT: 134°F UEL: ? LEL: ?	Water, steam [Note: Slowly corrodes metals.]	Tenax GC (2); Thermal desorp; GC/FID; II(5) [P&CAM #291]
1697 58					Sp.Gr(59°F): 1.32 Combustible Solid			
Chlorobenzene C_6H_5Cl 108-90-7 CZ0175000	Benzene chloride, Chlorobenzol, MCB, Monochlorobenzene, Phenyl chloride	NIOSH See Appendix D OSHA 75 ppm (350 mg/m³)	2400 ppm	Colorless liquid with an almond-like odor.	MW: 112.6 BP: 270°F Sol: 0.05% Fl.P: 85°F IP: 9.07 eV	VP(77°F): 12 mm FRZ: -50°F UEL: 9.6% LEL: 1.3%	Strong oxidizers	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
1134 27	1 ppm = 4.68 mg/m³				Sp.Gr: 1.11 Class IC Flammable Liquid			

000071

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed contam Provide: Eyewash, quick drench	NIOSH/OSHA 2.5 ppm: SA:CF[a] 5 ppm: SCBAF/SAF 20 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Eye, skin burns; in animals: lac; corneal ulcer; pulm edema	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Skin, eyes
Clothing: Any poss >0.1%/Repeat <0.1% Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: CCROV*/SA*/SCBA* 25 ppm: SA:CF*/PAPROV* 50 ppm: CCRFOV/GMFOV/SCBAF/SAF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin, eyes, muc memb; skin burns; eye damage; pulm edema; skin, resp sys sens: narco, coma	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Eyewash	NIOSH/OSHA 3 mg/m³: CCROVDM 7.5 mg/m³: SA:CF[a]/PAPROVDM[a] 15 mg/m³: CCRFOVHIE/SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; pulm edema	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	OSHA 1000 ppm: PAPROV[a]/CCRFOV 1875 ppm: SA:CF[a] 2400 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin, eyes, nose; drow, inco; in animals: liver, lung, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, skin, CNS, liver
Chlorobenzene						

7353

000072

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
o-Chlorobenzylidene malononitrile $ClC_6H_4CH=C(CN)_2$ 2698-41-1 OO3675000	2-Chlorobenzalmalonitrile, CS, OCBM	NIOSH/OSHA C 0.05 ppm (0.4 mg/m³) [skin]	2 mg/m³	White crystalline solid with a pepper-like odor.	MW: 188.6 BP: 590-599°F Sol: Insoluble Fl.P: ? IP: ? Combustible Solid	VP: 1 mm MLT: 199-203°F UEL: ? LEL: ?	Strong oxidizers	Filter/ Tenax GC; Reagent; HPLC/UVD; II(5) [P&CAM #304]
Chlorobromomethane CH_2BrCl 74-97-5 PA5250000 1887 58	Bromochloromethane, CB, CBM, Fluorocarbon 1011, Halon® 1011, Methyl chlorobromide 1 ppm = 5.38 mg/m³	NIOSH/OSHA 200 ppm (1050 mg/m³)	5000 ppm	Colorless to pale yellow liquid with a chloroform-like odor.	MW: 129.4 BP: 155°F Sol: Insoluble Fl.P: NA IP: 10.77 eV Sp.Gr: 1.93 Noncombustible Liquid	VP(77°F): 160 mm FRZ: -124°F UEL: NA LEL: NA	Chemically-active metals such as calcium, powdered aluminum, zinc & magnesium	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
Chlorodiphenyl (42% chlorine) $C_6H_4ClC_6H_3Cl_2$ (approx) 53469-21-9 TQ1356000 2315 31	Aroclor® 1242, PCB, Polychlorinated biphenyl 1 ppm = 10.72 mg/m³	NIOSH Ca See Appendix A 0.001 mg/m³ OSHA 1 mg/m³ [skin]	Ca [10 mg/m³]	Colorless to light colored, viscous liquid with a mild hydrocarbon odor.	MW: 258(approx) BP: 617-691°F Sol: Insoluble Fl.P: ? 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, and chlorinated dibenzo-p-dioxins.	VP: 0.001 mm FRZ: -2°F UEL: ? LEL: ?	Strong oxidizers	Filter/ Florisil; Hexane; GC/ECD; III [#5503, PCBs]
Chlorodiphenyl (54% chlorine) $C_6H_3Cl_2C_6H_2Cl_3$ (approx) 11097-69-1 TQ1360000 2315 31	Aroclor® 1254, PCB, Polychlorinated biphenyl 1 ppm = 13.55 mg/m³	NIOSH Ca See Appendix A 0.001 mg/m³ 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: ? 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, and chlorinated dibenzo-p-dioxins.	VP: 0.00006 mm FRZ: 50°F UEL: ? LEL: ?	Strong oxidizers	Filter/ Florisil; Hexane; GC/ECD; III [#5503, PCBs]

000073

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards					
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt contam/daily After work any poss contam Prompt non-imperv contam	NIOSH/OSHA 2 mg/m³: SA:CF[£]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Pain, burn eyes, lac, conj; eryt eyelids, blepharospasm; irrit throat, cough, chest constric; head; eryt, vesic skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, skin, eyes
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Prompt non-imperv wet	NIOSH/OSHA 1000 ppm: PAPROV[£]/CCRFOV 5000 ppm: SA:CF[£]/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Disorientation, dizz; irrit eyes, throat, skin; pulm edema	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, liver, kidneys, resp sys, CNS
Clothing: Goggles: Wash: Change: Remove:	Any poss Reason prob Prompt contam N.R. Prompt contam non-imperv	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes; chloracne; liver damage; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, eyes, liver
Clothing: Goggles: Wash: Change: Remove:	Any poss Reason prob Immed contam N.R. Prompt non-imperv wet	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; acne-form derm; [carc]; in animals: liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, eyes, liver

Chlorodiphenyl (54% chlorine)

7353

000074

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Chloroform $CHCl_3$ 67-66-3 FS9100000 1888 55	Methane trichloride, Trichloromethane 1 ppm = 4.96 mg/m³	NIOSH Ca See Appendix A ST 2 ppm (9.78 mg/m³) [60-min] OSHA 2 ppm (9.78 mg/m³)	Ca [1000 ppm] ACGIH A2	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; III [#1003, Halogenated Hydrocarbons]
bis-Chloromethyl ether $(CH_2Cl)_2O$ 542-88-1 KN1575000 2249 55	BCME, bis-CME, *Chloromethyl ether*, Dichloromethyl ether, Dichlorodimethyl ether, Oxybis(chloromethane) 1 ppm = 4.78 mg/m³	NIOSH Ca *See Appendix A* OSHA [1910.1008] See Appendix B ACGIH A1, 0.001 ppm (0.005 mg/m³)	Ca	Colorless liquid with a suffocating odor.	MW: 115.0 BP: 223°F Sol: Reacts Fl.P: <66°F IP: ? Sp.Gr: 1.32 Class IA Flammable Liquid	VP(72°F): 30 mm FRZ: -43°F UEL: ? LEL: ?	Acids, water [Note: Reacts with water to form hydrochloric acid and formaldehyde.]	Imp; Reagent; GC/ECD OSHA [#10]
Chloromethyl methyl ether CH_3OCH_2Cl 107-30-2 KN6650000 1239 28	Chlorodimethyl ether, Chloromethoxymethane, CMME, Dimethylchloroether, Methylchloromethyl ether 1 ppm = 3.35 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1006] See Appendix B ACGIH A2	Ca	Colorless liquid with an irritating odor.	MW: 80.5 BP: 138°F Sol: Reacts Fl.P(oc): 32°F IP: 10.25 eV Sp.Gr: 1.06 Class IA Flammable Liquid	VP: ? FRZ: -154°F UEL: ? LEL: ?	Water [Note: Reacts with water to form hydrochloric acid and formaldehyde.]	Imp; Hexane; GC/ECD; II(1) [P&CAM #220]
1-Chloro-1-nitropropane $CH_3CH_2CHClNO_2$ 600-25-9 TX5075000 1 ppm = 5.14 mg/m³	Korax, Lanstan® 000075	NIOSH/OSHA 2 ppm (10 mg/m³)	2000 ppm	Colorless liquid with an unpleasant odor. [fungicide]	MW: 123.6 BP: 289°F Sol: 0.5% Fl.P(oc): 144°F IP: ? Sp.Gr: 1.21 Class IIIA Combustible Liquid	VP(77°F): 6 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, acids	Chrom-10; Ethyl Acetate; GC/FID; II(5) [#S211]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv *contam*	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz, mental dullness, nau, disorientation; head, ftg; anes; hepatomegaly; irrit eyes, skin; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention *immed*		*Liver, kidneys,* heart, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: *Immed contam* Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Con	Irrit eyes, skin, muc memb of resp system; pulm congestion, edema; corneal damage, nec; reduced pulm function, cough, dysp, wheez; blood-stained sputum, bronchial secretions; *[carc]*	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Resp support Medical attention *immed*	*Lungs, eyes,* skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: *Immed contam* Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Con	Irrit eyes, skin, muc memb; pulm edema, pulm congestion, pneu; burns, nec; cough, wheez, pulm congestion; blood stained-sputum; low-wgt; loss; bronchial *secretions; [carc]*	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Resp support Medical attention immed	*Resp sys, skin,* eyes, muc memb
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA *50 ppm: SA:CF*/PAPROV** 100 ppm: CCRFOV/GMFOV/SCBAF/SAF 2000 ppm: SAF:PD,PP §: 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:	Irr immed Soap wash Resp support Medical attention *immed*	*In animals: resp* sys, liver, kidneys, CVS

1-Chloro-1-nitropropane

7353

000076

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Chloropicrin CCl_3NO_2 76-06-2 PB6300000 1580 56 2929 52 (flam. mixture) 1583 56 (mixture)	Nitrochloroform, Nitrotrichloromethane, Trichloronitromethane 1 ppm = 6.83 mg/m³	NIOSH/OSHA 0.1 ppm (0.7 mg/m³)	4 ppm	Colorless to faint yellow, oily liquid with an intensely irritating odor. [pesticide]	MW: 164.4 BP: 234°F Sol: 0.2% FI.P: NA IP: ? Sp.Gr: 1.66 Noncombustible Liquid	VP: 20 mm FRZ: -93°F UEL: NA LEL: NA	Strong oxidizers [Note: With strong initiation, the heated material under confinement will detonate.]	None available
beta-Chloroprene CH_2=CClCH=CH_2 126-99-8 EI9625000 1991 30 (inhibited)	2-Chloro-1,3-butadiene; Chlorobutadiene; Chloroprene 1 ppm = 3.68 mg/m³	NIOSH Ca See Appendix A C 1 ppm (3.6 mg/m³) [15-min] OSHA 10 ppm (35 mg/m³) [skin]	Ca [400 ppm]	Colorless liquid with a pungent, ether-like odor.	MW: 88.5 BP: 139°F Sol: Slight FI.P: -4°F IP: 8.79 eV Sp.Gr: 0.96 Class IA Flammable Liquid	VP: 188 mm FRZ: -153°F UEL: 20.0% LEL: 4.0%	Peroxides & other oxidizers [Note: Polymerizes at room temperature unless inhibited with antioxidants.]	Char; CS_2; GC/FID; III [#1002]
Chromic acid and chromates (as CrO_3) H_2CrO_4 (acid) 7738-94-5 (acid) GB2450000 (acid) 1755 60 (acid soln) 1463 42 (acid, solid)	Chromic acid: none Synonyms of chromates (i.e., chromium(VI) compounds) vary depending upon the specific compound.	NIOSH Ca See Appendix A 0.001 mg/m³ See Appendix C OSHA C 0.1 mg/m³ See Appendix C ACGIH See Appendix C	Ca [30 mg/m³]	Appearance and odor vary depending upon the specific compound.	Properties vary depending upon the specific compound. Chromic acid is noncombustible, but will accelerate the burning of combustible materials.		Chromic acid: Combustible, organic, or other readily oxidizable materials (paper, wood, sulfur, aluminum, plastics, etc.); corrosive to metals	Filter; Reagent; Vis; III [#7600, Hexavalent Chromium]
Chromium metal (as Cr) Cr 7440-47-3 GB4200000	Chrome, Chromium	NIOSH 0.5 mg/m³ See Appendix C OSHA 1 mg/m³ See Appendix C ACGIH See Appendix C	N.E.	Blue-white to steel-gray, lustrous, brittle, hard 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; AA; III [#7024]

000077

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 2.5 ppm: SA:CF[c]/PAPROV[c] 4 ppm: SCBAF/SAF/CCRFOV/GMFOV §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Eye irrit, lac; cough, pulm edema; nau, vomit; skin irrit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, resp sys; ner, irrity; derm; alopecia; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Resp sys irrit, nasal septum perf; liver, kidney damage; leucyt, leupen, monocy, eosin; eye inj, conj; skin ulcer, sens derm; [carc]	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed	Blood, resp sys, liver, kidneys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH 2.5 mg/m³: DM* 5 mg/m³: DMXSQ*/SA*/SCBA* 12.5 mg/m³: PAPRDM*/SA:CF* 25 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing	Histologic fibrosis of lungs	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Resp sys
Chromium metal (as Cr)					

7353

71

000078

Chemical name, structure/formula, CAS and RTECS Nos., and 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 VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chromium(II) and (III) compounds (as Cr)	Synonyms vary depending upon the specific Cr(II) or Cr(III) compound.	NIOSH/OSHA 0.5 mg/m³ See Appendix C ACGIH See Appendix C	N.E.	Appearance and odor vary depending upon the specific compound.	Properties vary depending upon the specific compound.	Water	Filter; Acid; AA; III [#7024]
Coal tar pitch volatiles (benzene-soluble fraction) 65996-93-2 GF8655000	Synonyms vary depending upon the specific compound (e.g., benzo(a)pyrene, phenanthrene, acridine, chrysene, anthracene & pyrene). [Note: NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products.]	NIOSH Ca See Appendix A 0.1 mg/m³ (cyclohexane-extractable fraction) See Appendix C OSHA 0.2 mg/m³	Ca [700 mg/m³] ACGIH A1	Black or dark-brown amorphous residue.	Properties vary depending upon the specific compound. Combustible Solid	Strong oxidizers	Filter; Benzene; Grav; III [#5023]
Cobalt metal, dust, and fume (as Co) Co 7440-48-4 (Metal) GF8750000 (Metal)	Metal: none Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 0.05 mg/m³	20 mg/m³	Metal: Odorless, silver-gray to black solid.	MW: 58.9 BP: 5612°F Sol: Insoluble Fl.P: NA IP: NA VP: 0 mm (approx) MLT: 2719°F UEL: NA LEL: NA Sp.Gr: 8.92 (Metal) Metal: Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures.	Strong oxidizers, ammonium nitrate	Filter; Acid; AA; III [#7027]
Copper dusts and mists (as Cu) Cu 7440-50-8 (Metal) GL5325000 (Metal)	Metal: none Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 1 mg/m³	N.E.	Metal: Reddish, lustrous, malleable, odorless solid.	MW: 63.5 BP: 4703°F Sol: Insoluble Fl.P: NA IP: NA VP: 0 mm (approx) MLT: 1981°F UEL: NA LEL: NA Sp.Gr: 8.94 (Metal) Metal: Noncombustible Solid in bulk form, but powdered form may ignite.	Oxidizers, alkalis, sodium azide, acetylene	Filter; Acid; AA; III [#7029]

000079

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 2.5 mg/m³: DM* 5 mg/m³: DMXSQ*/SA*/SCBA* 12.5 mg/m³: PAPRDM*/SA:CF* 25 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Ing Con	Sens derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Skin
Clothing: Reason prob Goggles: Reason prob Wash: Daily (reason prob) Change: After work if reason prob contam Remove: N.R.	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Con	Derm, bron, [carc]	Eye: Irr immed Skin: Soap wash Breath: Resp support		Resp sys, bladder, kidneys, skin
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 0.25 mg/m³: DM^ 0.5 mg/m³: DMXSQ*^/DMFu*/SA*/SCBA* 1.25 mg/m³: PAPRDM*^/SA:CF*/ PAPRDMFu* 2.5 mg/m³: HIEF/SCBAF/SAF 20 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Cough, dysp, decrease pulm func; low-wgt; derm; diffuse nodular fibrosis; resp hypersensitivity	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Resp sys, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt contam non-imperv	NIOSH/OSHA 5 mg/m³: DM* 10 mg/m³: DMXSQ*^/SA*/SCBA* 25 mg/m³: PAPRDM*/SA:CF* 50 mg/m³: HIEF/SCBAF/SAF/PAPRTHIE* 2000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit nasal muc memb, pharynx; nasal perforation; eye irrit; metallic taste; *derm;* in animals: lung, liver, kidney damage; anemia	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, liver, kidneys, inc risk with Wilson's disease
Copper dusts and mists (as Cu)						

7353

000080

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Copper fume (as Cu) CuO/Cu 7440-50-8 (Cu) 1317-38-0 (CuO) GL5350000 (Cu)	CuO: Black copper oxide, Copper monoxide, Copper(II) oxide, Cupric oxide Cu: none	NIOSH/OSHA 0.1 mg/m³	N.E.	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 & Mists for properties of Cu.]	Acetylene	Filter; Acid; AA; III [#7029]
Cotton dust (raw) GN2275000	None	NIOSH 0.200 mg/m³ See Appendix C OSHA [Z-1-A & 1910.1043] 1 mg/m³ (waste processing during waste recycling [sorting, blending, cleaning & willowing] & garretting) 0.200 mg/m³ (textile yarn manufacturing) 0.750 mg/m³ (textile slashing & weaving) 0.500 mg/m³ (all other operations) See Appendix C	N.E.	Colorless, odorless solid.	MW: ? BP: Decomposes Sol: Insoluble Fl.P: ? IP: NA Combustible Solid	VP: 0 mm (approx) MLT: Decomposes UEL: ? LEL: ?	Strong oxidizers	Vertical elut; none; Grav; OSHA [1910.1043]
Crag® herbicide $C_6H_3Cl_2OCH_2CH_2OSO_3Na$ 136-78-7 KK4900000	Crag® herbicide No. 1; Sesone; Sodium-2-(2,4-dichlorophenoxy) ethyl sulfate	NIOSH/OSHA 10 mg/m³ (total) 5 mg/m³ (resp)	5000 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]
Cresol (all isomers) $CH_3C_6H_4OH$ 1319-77-3 GO5950000 2076 55	ortho-, meta-, or para-Cresol; Cresylic acid; 2-, 3-, or 4-Methyl phenol 1 ppm = 4.50 mg/m³	NIOSH 2.3 ppm (10 mg/m³) OSHA 5 ppm (22 mg/m³) [skin]	250 ppm	Colorless, yellow, brown, or pinkish, oily liquids or solids with a sweet, tarry odor.	MW: 108.2 BP: 376-397°F Sol: 2% Fl.P: 178°F(o) 187°F(m) 187°F(p) IP: 8.93 eV(o) 8.98 eV(m) 8.97 eV(p) Sp.Gr(77°F): 1.03	VP(100°F): 1 mm FRZ: 52-95°F UEL: ? LEL(300°F): 1.4%(o) 1.1%(m) 1.1%(p) Class IIIA Combustible Liquids	Strong oxidizers, acids	Si gel; Acetone; GC/FID; III [#2001]

000081

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 1 mg/m³: DMFu/SA/SCBA 2.5 mg/m³: PAPRDMFu/SA:CF 5 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Metal fume fever: chills, musc ache, nau, fever, dry throat, cough, weak, lass; irrit eyes, upper resp tract; metallic or sweet taste; discoloration skin, hair	Breath	Resp support	Resp sys, skin, eyes, inc risk with Wilson's disease
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH 1 mg/m³: D 2 mg/m³: DXSQ/SA/HiE/SCBA 5 mg/m³: PAPRD/SA:CF 10 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 20 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Tight chest, cough, wheez, dysp; decrease FEV; bron; mal; cough, fever, chills, upper resp symptoms after initial exposure	Eye: Breath:	Irr immed Fresh air	Resp sys, CVS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: DM 100 mg/m³: DMXSQ/SA/SCBA 250 mg/m³: PAPRDM/SA:CF 500 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE*/SAT:CF* 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	None known	Eye: Skin: Breath: Swallow:	Irr immed Water wash prompt Resp support Medical attention immed	None known
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH 23 ppm: CCROVDM/SA/SCBA 57.5 ppm: SA:CF/PAPROVDM 115 ppm: CCRFOVHiE/SCBAF/SAF/GMFOVHiE/PAPRTHiE*/SAT:CF* 250 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	CNS effects; conf, depres, resp fail; dysp, irreg rapid resp; weak pulse; skin, eye burns; derm; lung, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, resp sys, liver, kidneys, skin, eyes

Cresol (all isomers)

7353

000082

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Crotonaldehyde $CH_3CH=CHCHO$ 123-73-9 (trans-isomer) GP9625000 (trans-isomer) 1143 28 (inhibited)	2-Butenal, beta-Methylacrolein, Propylene aldehyde 1 ppm = 2.91 mg/m³	NIOSH/OSHA 2 ppm (6 mg/m³)	400 ppm	Water-white liquid with a suffocating odor. [Note: Turns pale-yellow on contact with air.]	MW: 70.1 BP: 219°F Sol: 18% Fl.P: 45°F IP: 9.73 eV Sp.Gr: 0.87 Class IA 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; none; PLR; II(5) [P&CAM #285]
Cumene $C_6H_5CH(CH_3)_2$ 98-82-8 GR8575000 1918 28	Cumol, Isopropyl benzene, 2-Phenyl propane 1 ppm = 5.00 mg/m³	NIOSH/OSHA 50 ppm (245 mg/m³) [skin]	8000 ppm	Colorless liquid with a sharp, penetrating, aromatic odor.	MW: 120.2 BP: 306°F Sol: Insoluble Fl.P: 96°F IP: 8.75 eV Sp.Gr: 0.86 Class IC Flammable Liquid	VP(77°F): 5 mm FRZ: -141°F UEL: 6.5% LEL: 0.9%	Oxidizers	Char; CS_2; GC/FID; III [#1501, Aromatic Hydrocarbons]
Cyanides (as CN) 1: KCN 2: NaCN 1: 151-50-8/TS8750000 2: 143-33-9/VZ7530000 1680 55 (KCN soln) 1689 55 (NaCN)	1: Potassium cyanide, Potassium salt of hydrocyanic acid 2: Sodium cyanide, Sodium salt of hydrocyanic acid Synonyms of other compounds vary depending upon the specific compound.	NIOSH C 5 mg/m³ (4.7 ppm) [10-min] OSHA 5 mg/m³	50 mg/m³	KCN & NaCN are white granular or crystalline solids with a faint almond-like odor.	MW: 65.1/49.0 BP: 7/2725°F Sol(77°F): 72/58% Fl.P: NA/NA IP: NA/NA Sp.Gr: 1.55 (KCN)/1.60 (NaCN) Noncombustible Solids, but contact with acids releases highly flammable hydrogen cyanide.	VP: 0/0 mm (approx) MLT: 1173/ 1047°F UEL: NA/NA LEL: NA/NA	Strong oxidizers, such as acids, acid salts, chlorates & nitrates	Filter/Bub; KOH; ISE; III [#7904]
Cyclohexane C_6H_{12} 110-82-7 GU6300000 1145 26	Benzene hexahydride, Hexahydrobenzene, Hexamethylene, Hexanaphthene 1 ppm = 3.50 mg/m³	NIOSH/OSHA 300 ppm (1050 mg/m³)	10,000 ppm	Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.]	MW: 84.2 BP: 177°F Sol: Insoluble Fl.P: 0°F IP: 9.88 eV Sp.Gr: 0.78 Class IA Flammable Liquid	VP(77°F): 98 mm FRZ: 44°F UEL: 8% LEL: 1.3%	Oxidizers	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]

000083

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Any poss Immed contam N.R. Immed wet (flamm) Eyewash, quick drench	NIOSH/OSHA 20 ppm: CCROV*/SA*/SCBA* 50 ppm: SA:CF*/PAPROV* 100 ppm: CCRFOV/GMFOV/SCBAF/SAF 400 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; in animals: dysp, pulm edema, irrit skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, eyes, skin
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Prompt non-imperv wet	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, muc memb; head; derm; narco, coma	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, upper resp sys, skin, CNS
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Any poss Immed contam After work if any poss contam Immed non-imperv contam Eyewash, quick drench	NIOSH/OSHA 50 mg/m³: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Abs Ing Con	Asphy and death can occur; weak, head, conf; nau, vomit; incr rate resp; slow gasping resp; irrit eyes, skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CVS, CNS, liver, kidneys, skin
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[c]/CCRFOV 7500 ppm: SA:CF[c] 10,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; drow; derm; narco, coma	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, skin, CNS
Cyclohexane							

7353

000084

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Cyclohexanol $C_6H_{11}OH$ 108-93-0 GV7875000	Anol, Cyclohexyl alcohol, Hexahydrophenol, Hexalin, Hydralin, Hydroxycyclohexane 1 ppm = 4.17 mg/m³	NIOSH/OSHA 50 ppm (200 mg/m³) [skin]	3500 ppm	Sticky solid or colorless to light-yellow liquid (above 77°F) with a camphor-like odor.	MW: 100.2 BP: 322°F Sol: 4% Fl.P: 154°F IP: 10.00 eV Sp.Gr: 0.96 Class IIIA Combustible Liquid	VP: 1 mm MLT: 77°F UEL: ? LEL: ?	Strong oxidizers	Char; 2-Propanol/CS_2; GC/FID; III [#1402, Alcohols III]
Cyclohexanone $C_6H_{10}O$ 108-94-1 GW1050000 1915 26	Cyclohexyl ketone, Pimelic ketone 1 ppm = 4.08 mg/m³	NIOSH/OSHA 25 ppm (100 mg/m³) [skin]	5000 ppm	Water-white to pale-yellow liquid with a peppermint- or acetone-like odor.	MW: 98.2 BP: 312°F Sol(50°F): 15% Fl.P: 146°F IP: 9.14 eV Sp.Gr: 0.95 Class IIIA Combustible Liquid	VP(77°F): 5 mm FRZ: -49°F UEL: 9.4% LEL(212°F): 1.1%	Oxidizers, nitric acid	Char; CS_2; GC/FID; III [#1300, Ketones I]
Cyclohexene C_6H_{10} 110-83-8 GW2500000 2256 29	Benzene tetrahydride, Tetrahydrobenzene 1 ppm = 3.42 mg/m³	NIOSH/OSHA 300 ppm (1015 mg/m³)	10,000 ppm	Colorless liquid with a sweet odor.	MW: 82.2 BP: 181°F Sol: Insoluble Fl.P: 11°F IP: 8.95 eV Sp.Gr: 0.81 Class IA Flammable Liquid	VP(100°F): 160 mm FRZ: -154°F UEL ? LEL ?	Strong oxidizers [Note: Forms explosive peroxides with oxygen upon storage.]	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
Cyclopentadiene C_5H_6 542-92-7 GY1000000	1,3-Cyclopentadiene 1 ppm = 2.75 mg/m³	NIOSH/OSHA 75 ppm (200 mg/m³)	2000 ppm	Colorless liquid with an irritating, terpene-like odor.	MW: 66.1 BP: 107°F Sol: Insoluble Fl.P(oc): 77°F IP: 8.56 eV Sp.Gr: 0.80 Class IB Flammable Liquid	VP: ? FRZ: -121°F UEL: ? LEL: ?	Strong oxidizers [Note: Polymerizes to dicyclopentadiene upon standing.]	Chrom-104°; Ethyl acetate; GC/FID; III [#2523]

000085

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 3500 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, skin; narco	Eye: Irr immed Skin: Water wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 625 ppm: SA:CF[‡]/PAPROV[‡] 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, muc memb; head; narco, coma; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[‡]/CCRFOV 7500 ppm: SA:CF[‡] 10,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys, skin; drow	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 750 ppm: CCROV/SA/SCBA 1000 ppm: PAPROV/CCRFOV/PAPRTOV 1875 ppm: SA:CF 2000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, resp sys
Cyclopentadiene					

7353

000086

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
2,4-D $Cl_2C_6H_3OCH_2COOH$ 94-75-7 AG6825000	2,4-Dichlorophenoxyacetic acid; Dichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m³	500 mg/m³	White to yellow crystalline, odorless powder. [herbicide]	MW: 221.0 BP: Decomposes Sol: 0.05% Fl.P: NA IP: ? Sp.Gr(86°F): 1.57 Noncombustible Solid, but may be dissolved in flammable liquids.	VP: Low MLT: 280°F UEL: NA LEL: NA	Strong oxidizers	Filter; Methanol; HPLC/UVD; III [#5001]
2765 55								
DDT $(C_6H_4Cl)_2CHCCl_3$ 50-29-3 KJ3325000	1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane; p,p'-DDT; Dichlorodiphenyltrichloroethane	NIOSH Ca See Appendix A 0.5 mg/m³ OSHA 1 mg/m³ [skin]	Ca [N.E.]	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: Low MLT: 227°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; Isooctane; GC/ECD; II(3) [#S274]
2761 55								
Decaborane $B_{10}H_{14}$ 17702-41-9 HD1400000	Boron hydride, Decaboron tetradecahydride	NIOSH/OSHA 0.3 mg/m³ (0.05 ppm) ST 0.9 mg/m³ (0.15 ppm) [skin]	100 mg/m³	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(77°F): 0.94 Combustible Solid	VP(77°F): 0.05 mm MLT: 211°F UEL: ? LEL: ?	Oxidizers, water, halogenated materials (especially carbon tetrachloride) [Note: May spontaneously ignite on exposure to air. Decomposes slowly in hot water.]	None available
1868 34								
Demeton $C_8H_{19}O_3PS_2$ 8065-48-3 TF3150000	O-O-Diethyl-(O and S)-2-(ethylthio)ethyl phosphorothioate mixture; Systox®	NIOSH/OSHA 0.1 mg/m³ [skin]	20 mg/m³	Amber, oily liquid with a sulfur-like odor. [insecticide]	MW: 258.3 BP: Decomposes Sol: 0.01% Fl.P: 113°F IP: ? Sp.Gr: 1.12 Class II Combustible Liquid	VP: 0.0003 mm FRZ: <-13°F UEL: ? LEL: ?	Strong oxidizers, alkalis, water	Filter/XAD-2; Toluene; GC/FPD; III [#5514]

1 ppm = 10.74 mg/m³

000097

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 100 mg/m³: CCROVDMFu/SA/SCBA 250 mg/m³: PAPROVDMFu/SA:CF 500 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SCBAF/SAF/SAT:CF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Weak, stupor, hyporeflexia, musc twitch; convuls; derm; in animals: liver, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Pares tongue, lips, face; tremor; appre, dizz, conf, mal, head, ftg; convuls; paresis hands; vomit; irrit eyes, skin; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		CNS, kidneys, liver, skin, PNS
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam/daily Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 3 mg/m³: SA/SCBA 7.5 mg/m³: SA:CF 15 mg/m³: SCBAF/SAF/SAT:CF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 1 mg/m³: SA/SCBA 2.5 mg/m³: SA:CF 5 mg/m³: SCBAF/SAF/SAT:CF 20 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Miosis, ache eyes, rhin, head; tight chest, wheez, lar spasm, salv, cyan; anor, nau, vomit, abdom cramp, diarr; local sweat; musc fasc, weak, para; gidd, conf, ataxia; convuls, coma; low BP; card irregularities; irrit eyes, skin	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CVS, CNS, skin, eyes, blood chol

Demeton

000088

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Diacetone alcohol $CH_3COCH_2C(CH_3)_2OH$ 123-42-2 SA9100000 1148 26	Diacetone, 4-Hydroxy-4-methyl-2-pentanone, 2-Methyl-2-pentanol-4-one 1 ppm = 4.83 mg/m³	NIOSH/OSHA 50 ppm (240 mg/m³)	2100 ppm	Colorless liquid with a faint, minty odor.	MW: 116.2 BP: 334°F Sol: Miscible Fl.P: 125°F IP: ? Sp.Gr: 0.94 Class II Combustible Liquid	VP: 1 mm FRZ: -47°F UEL: 6.9% LEL: 1.8%	Strong oxidizers, strong alkalis	Char; 2-Propanol/CS_2; GC/FID; III [#1402, Alcohols, III]
Diazomethane CH_2N_2 334-88-3 PA7000000 82 1 ppm = 1.75 mg/m³	Azimethylene, Azomethylene, Diazirine, Diazomethane	NIOSH/OSHA 0.2 ppm (0.4 mg/m³)	2 ppm	Yellow gas with a musty odor. [Note: Shipped as a liquefied compressed gas.]	MW: 42.1 BP: -9°F Sol: Reacts Fl.P: NA (Gas) IP: 9.00 eV 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; III [#2515]
Diborane B_2H_6 19287-45-7 HQ9275000 1911 18	Boroethane, Boron hydride, Diboron hexahydride 1 ppm = 1.15 mg/m³	NIOSH/OSHA 0.1 ppm (0.1 mg/m³)	40 ppm	Colorless gas with a repulsive, sweet odor. [Note: Usually shipped in pressurized cylinders.]	MW: 27.7 BP: -135°F Sol: Reacts Fl.P: NA (Gas) IP: 11.38 eV Flammable Gas	VP: >1 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; III [#6006]
1,2-Dibromo-3-chloro-propane $CH_2BrCHBrCH_2Cl$ 96-12-8 TX8750000 2872 58	1-Chloro-2,3-dibromo-propane; DBCP; Dibromochloropropane 1 ppm = 9.83 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1044] 0.001 ppm 000089	Ca	Dense yellow or amber liquid with a pungent odor at high concentrations. [Note: A solid below 43°F.] [pesticide]	MW: 236.4 BP: 384°F Sol(70°F): 0.1% Fl.P(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)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 1000 ppm: CCRFOV/PAPROV[c] 1250 ppm: SA:CF[c] 2100 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat, skin; corneal tissue damage; narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Prevent contam or freezing Goggles: Any poss Wash Prompt contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash	NIOSH/OSHA 2 ppm: SA*/SCBA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Cough, short breath; head; flush skin, fever; chest pain, pulm edema, pneuitis; irrit eyes; asthma; ftg	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, skin
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 1 ppm: SA/SCBA 2.5 ppm: SA:CF 5 ppm: SCBAF/SAF/SAT:CF 40 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Tight chest, precordial pain, short breath, non-productive cough, nau; head, li-head, vertl, chills, fever, ftg, weak, tremor, musc fasc; in animals: liver, kidney damage; pulm edema; hemorr	Eye: Irr immed Breath: Resp support		Resp sys, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Con	Drow; nau, vomit; irrit eyes, nose, throat, skin; pulm edema, [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, skin, liver, kidneys, spleen, reproductive sys, digestive sys

1,2-Dibromo-3-chloropropane

7353

000090

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Dibutyl phosphate $(C_4H_9O)_2(OH)PO$ 107-66-4 TB9605000	Dibutyl acid o-phosphate, di-n-Butyl hydrogen phosphate, Dibutyl phosphoric acid	NIOSH/OSHA 1 ppm (5 mg/m³) ST 2 ppm (10 mg/m³)	125 ppm	Pale amber, odorless liquid.	MW: 210.2 BP: 212°F (Decomposes) Sol: Insoluble Fl.P: ? IP: ?	VP: 1 mm (approx) FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH_3CN; GC/FPD; III [#5017]
	1 ppm = 8.74 mg/m³				Sp.Gr: 1.06 Combustible Liquid			
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	9300 mg/m³	Colorless to faint yellow, oily liquid with a slight, aromatic odor.	MW: 278.3 BP: 644°F Sol(77°F): 0.5% Fl.P: 315°F IP: ?	VP: <0.01 mm FRZ: -31°F UEL: ? LEL(456°F): 0.5%	Nitrates; strong oxidizers, alkalis & acids; liquid chlorine	Filter; CS_2; GC/FID; III [#5020]
	1 ppm = 11.57 mg/m³				Sp.Gr: 1.05 Class IIIB Combustible Liquid			
o-Dichlorobenzene $C_6H_4Cl_2$ 95-50-1 CZ4500000	o-DCB; 1,2-Dichlorobenzene; ortho-Dichlorobenzene; o-Dichlorobenzol	NIOSH/OSHA C 50 ppm (300 mg/m³)	1000 ppm	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide]	MW: 147.0 BP: 357°F Sol: 0.01% Fl.P: 151°F IP: 9.06 eV	VP: 1 mm FRZ: 1°F UEL: 9.2% LEL: 2.2%	Strong oxidizers, aluminum, acids, acid fumes, chlorides	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
1591 58	1 ppm = 6.11 mg/m³				Sp.Gr: 1.30 Class IIIA Combustible Liquid			
p-Dichlorobenzene $C_6H_4Cl_2$ 106-46-7 CZ4550000	p-DCB; 1,4-Dichlorobenzene; para-Dichlorobenzene; Dichlorocide	NIOSH Ca See Appendix A OSHA 75 ppm (450 mg/m³) ST 110 ppm (675 mg/m³)	Ca [1000 ppm]	Colorless or white crystalline solid with a mothball-like odor. [insecticide]	MW: 147.0 BP: 345°F Sol: 0.008% Fl.P: 150°F IP: 8.98 eV	VP(77°F): 0.4 mm MLT: 128°F UEL: ? LEL: ?	Oxidizers	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
1592 58					Sp.Gr: 1.25 Combustible Solid, but may take some effort to ignite.			

000091

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Reason prob	NIOSH/OSHA	Inh	Irrit resp sys, skin;	Eye:	Irr immed	Resp sys, skin
Goggles:	Reason prob	10 ppm: SA/SCBA	Ing	head	Skin:	Soap wash prompt	
Wash:	Prompt contam	25 ppm: SA:CF	Con		Breath:	Resp support	
Change:	N.R.	50 ppm: SCBAF/SAF/SAT:CF			Swallow:	Medical attention immed	
Remove:	Prompt non-imperv contam	125 ppm: SA:PD,PP					
Provide:	Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOVHiE/SCBAE					
Clothing:	N.R.	NIOSH/OSHA	Inh	Irrit upper resp tract,	Eye:	Irr immed	Resp sys, GI tract
Goggles:	Reason prob	50 mg/m³: DMF	Ing	stomach	Skin:	Wash regularly	
Wash:	N.R.	125 mg/m³: PAPRDM[f]/SA:CF[e]	Con		Breath:	Resp support	
Change:	N.R.	250 mg/m³: HiEF/SCBAF/SAF			Swallow:	Medical attention immed	
Remove:	N.R.	9300 mg/m³: SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: HiEF/SCBAE					
Clothing:	Repeat	NIOSH/OSHA	Inh	Irrit nose, eyes; liver,	Eye:	Irr immed	Liver, kidneys, skin, eyes
Goggles:	Reason prob	1000 ppm: PAPROV[c]/CCRFOV	Abs	kidney damage; skin	Skin:	Soap wash prompt	
Wash:	Prompt contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Ing	blister	Breath:	Resp support	
Change:	N.R.	Escape: GMFOV/SCBAE	Con		Swallow:	Medical attention immed	
Remove:	Prompt non-imperv contam						
Clothing:	Repeat	NIOSH	Inh	Head; eye irrit, swell	Eye:	Irr immed	Liver, resp sys, eyes, kidneys, skin
Goggles:	Reason prob	¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Ing	periorb; profuse rhinitis;	Skin:	Soap wash	
Wash:	Daily (reason prob)	Escape: GMFOV/SCBAE	Con	anor, nau, vomit; low-wgt,	Breath:	Resp support	
Change:	N.R.			jaun, cirr; [carc]	Swallow:	Medical attention	
Remove:	N.R.			In animals: liver, kidney damage		immed	

p-Dichlorobenzene

7353

85

000092

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
3,3'-Dichlorobenzidine (and its salts) $C_6H_3ClNH_2C_6H_3ClNH_2$ 91-94-1 DD0525000	4,4'-Diamino-3,3'-dichlorobiphenyl; Dichlorobenzidine base; o,o'-Dichlorobenzidine; 3,3'-Dichlorobiphenyl-4,4'-diamine; 3,3'-Dichloro-4,4'-biphenyldiamine; 3,3'-Dichloro-4,4'-diaminobiphenyl	NIOSH Ca See Appendix A OSHA [1910.1007] See Appendix B ACGIH A2 [skin]	Ca	Gray to purple crystalline solid.	MW: 253.1 BP: 788°F Sol: Almost Insoluble Fl.P: ? IP: ?	VP: ? MLT: 271°F UEL: ? LEL: ?	None reported	Filter/Si gel; Reagent; HPLC/UVD; III [#5509]
Dichlorodifluoromethane CCl_2F_2 75-71-8 PA8200000 1028 12	Difluorodichloromethane, Fluorocarbon 12, Freon® 12, Halon® 122, Propellant 12, Refrigerant 12 1 ppm = 5.03 mg/m³	NIOSH/OSHA 1000 ppm (4950 mg/m³)	50,000 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 Nonflammable Gas	VP: >1 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; III [#1018]
1,3-Dichloro-5,5-dimethylhydantoin $C_5H_6Cl_2N_2O_2$ 118-52-5 MU0700000	Dactin, DDH, Halane	NIOSH/OSHA 0.2 mg/m³ ST 0.4 mg/m³	Unknown	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 27	Asymmetrical dichloroethane; Ethylidene chloride; 1,1-Ethylidene dichloride 1 ppm = 4.12 mg/m³	NIOSH/OSHA 100 ppm (400 mg/m³)	4000 ppm	Colorless, oily liquid with a chloroform-like odor.	MW: 99.0 BP: 135°F Sol: 0.6% Fl.P(oc): 22°F IP: 11.06 eV Sp.Gr: 1.18 Class IB Flammable Liquid	VP(77°F): 230 mm FRZ: -143°F UEL: ? LEL: 5.6%	Strong oxidizers, strong caustics	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]

000093

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Allergic skin reaction, sens, derm; head, dizz; caustic burns; frequent urination, dysuria; hema; GI upsets; upper resp infection; [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Bladder, liver, lung, skin, GI tract
Clothing: Prevent wet or freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Dizz, tremors, unconsciousness, card arrhy, card arrest	Eye: Irr immed Skin: Water flush immed Breath: Resp support		CVS, PNS
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 2 mg/m³: SA/SCBA 5 mg/m³: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Ing Con	Irrit eyes, muc memb, resp sys	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes
Clothing: Repeat Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: SA/SCBA 2500 ppm: SA:CF 4000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	CNS depres; skin irrit; liver, kidney damage	Eye: Irr immed Skin: Soap flush prompt Breath: Resp support Swallow: Medical attention immed		Skin, liver, kidneys

1,1-Dichloroethane

7353

000094

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
1,2-Dichloroethylene ClCH=CHCl 540-59-0 KV9360000	Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene	NIOSH/OSHA 200 ppm (790 mg/m³)	4000 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°F IP: 9.65 eV Sp.Gr(77°F): 1.27 Class IB Flammable Liquid	VP: 180-264 mm FRZ: -57 to -115°F UEL: 12.8% LEL: 5.6%	Strong oxidizers, strong alkalis, potassium hydroxide, copper .	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
1150 29	1 ppm = 4.03 mg/m³							
Dichloroethyl ether $(ClCH_2CH_2)_2O$ 111-44-4 KN0875000	bis(2-Chloroethyl)ether; 2,2'-Dichlorodiethyl ether	NIOSH Ca See Appendix A 5 ppm (30 mg/m³) ST 10 ppm (60 mg/m³) [skin] OSHA 5 ppm (30 mg/m³) ST 10 ppm (60 mg/m³) [skin]	Ca [250 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 IIIA 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; III [#1004]
1916 57	1 ppm = 5.94 mg/m³							
Dichloromonofluoromethane $CHCl_2F$ 75-43-4 PA8400000	Dichlorofluoromethane, Fluorodichloromethane, Freon® 21, Halon® 112, Refrigerant 21	NIOSH/OSHA 10 ppm (40 mg/m³)	50,000 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 Nonflammable Gas	VP: >1 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; III [#2516]
1029 12	1 ppm = 4.28 mg/m³							
1,1-Dichloro-1-nitroethane $CH_3CCl_2NO_2$ 594-72-9 KI1050000	Dichloronitroethane	NIOSH/OSHA 2 ppm (10 mg/m³)	150 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; III [#1601]
2650 57	1 ppm = 5.98 mg/m³							

000095

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[¥]/CCRFOV 4000 ppm: SA:CF[¥]/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; CNS depres	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, CNS
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Lac; irrit nose, throat, cough; nau, vomit; [carc]; in animals: pulm irrit, edema; liver damage	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes
Clothing: Any poss wet Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet	NIOSH/OSHA 100 ppm: SA/SCBA 250 ppm: SA:CF 500 ppm: SCBAF/SAF 10,000 ppm: SA:PD,PP 20,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Asphy, card arrhy, card arrest	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CVS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 20 ppm: SA/SCBA 50 ppm: SA:CF 100 ppm: SCBAF/SAF 150 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: irrit eyes, skin; liver, heart, kidney damage; pulm edema, hemorr	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Lungs

1,1-Dichloro-1-nitroethane

7353

000096

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Dichlorotetrafluoro-ethane $CClF_2CClF_2$ 76-14-2 KI1101000 1958 12	1,2-Dichlorotetra-fluoroethane; Freon® 114; Halon® 242; Refrigerant 114 1 ppm = 7.10 mg/m³	NIOSH/OSHA 1000 ppm (7000 mg/m³)	50,000 ppm	Colorless gas with a faint, ether-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]	MW: 170.9 BP: 38°F Sol: 0.01% Fl.P: NA IP: 12.20 eV Nonflammable Gas	VP: >1 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; III [#1016]
Dichlorvos $(CH_3O)_2P(O)OCH=CCl_2$ 62-73-7 TC0350000 2783 55	DDVP; 2,2-Dichlorovinyl dimethyl phosphate 1 ppm = 9.19 mg/m³	NIOSH/OSHA 1 mg/m³ [skin]	200 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% Fl.P(oc): >175°F IP: ? Sp.Gr(77°F): 1.42 Class III Combustible Liquid	VP(86°F): 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]
Dieldrin $C_{12}H_8Cl_6O$ 60-57-1 IO1750000 2761 55	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-dimethano-naphthalene; HEOD	NIOSH Ca See Appendix A 0.25 mg/m³ [skin] OSHA 0.25 mg/m³ [skin]	Ca [450 mg/m³]	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: Low MLT: 349°F UEL: NA LEL: NA	Strong oxidizers, active metals such as sodium, strong acids, phenols	Filter; Isooctane; GC/ECD; II(3) [#S283]
Diethylamine $(C_2H_5)_2NH$ 109-89-7 HZ8750000 1154 68	Diethamine; N,N-Diethylamine; N-Ethylethanamine 1 ppm = 3.04 mg/m³	NIOSH/OSHA 10 ppm (30 mg/m³) ST 25 ppm (75 mg/m³)	2000 ppm	Colorless liquid with a fishy, ammonia-like odor.	MW: 73.1 BP: 132°F Sol: Miscible Fl.P: -15°F IP: 8.01 eV 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; III [#2010]

000097

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss wet Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet	NIOSH/OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit resp sys; asphy; card arrhy, card arrest	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CVS
Clothing: Repeat Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam	NIOSH/OSHA 10 mg/m³: SA/SCBA 25 mg/m³: SA:CF 50 mg/m³: SCBAF/SAF/SAT:CF 200 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Miosis, ache eyes; rhin; head; tight chest, wheez, lar spasm, salv; cyan; anor, nau, vomit, diarr; sweat; musc fasc, para, gidd, ataxia; convuls; low BP, card irregularities; irrit skin, eyes	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CVS, CNS, eyes, skin, blood chol
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: 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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, liver, kidneys, skin
Clothing: Any poss liq Goggles: Any poss >0.5%/ Reason prob 0.5% Wash: Immed contam liq Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash (>0.5%)/ Quick drench (liq)	NIOSH/OSHA 250 ppm: SA:CF[ε]/PAPRS[ε] 500 ppm: GMFS/SCBAF/SAF/CCRFS 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Eye, skin, resp sys irrit	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes

7353

000098

Chemical name, structure/formula, CAS and RTECS Nos., and 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-Diethylaminoethanol $(C_2H_5)_2NCH_2CH_2OH$ 100-37-8 KK5075000 2686 29	Diethylaminoethanol; 2-Diethylaminoethyl alcohol; N,N-Diethylethanolamine; Diethyl-(2-hydroxyethyl)-amine; 2-Hydroxytriethylamine 1 ppm = 4.87 mg/m³	NIOSH/OSHA 10 ppm (50 mg/m³) [skin]	500 ppm	Colorless liquid with a nauseating, ammonia-like odor.	MW: 117.2 BP: 325°F Sol: Miscible Fl.P: 126°F IP: ? Sp.Gr: 0.89 Class II Combustible Liquid	VP: 21 mm FRZ: -94°F UEL: ? LEL: ?	Strong oxidizers, strong acids	Si gel; Methanol; GC/FID; III [#2007, Amino-ethanol Com-pounds]
Difluorodibromomethane CBr_2F_2 75-61-6 PA7525000 1941 58	Dibromodifluoromethane, Freon® 12B2, Halon® 1202 1 ppm = 8.72 mg/m³	NIOSH/OSHA 100 ppm (860 mg/m³)	2500 ppm	Colorless, heavy liquid or gas (above 76°F) with a characteristic odor.	MW: 209.8 BP: 76°F Sol: Insoluble Fl.P: NA IP: 11.07 eV Sp.Gr(59°F): 2.29 Nonflammable Liquid	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; III [#1012]
Diglycidyl ether $C_6H_{10}O_3$ 2238-07-5 KN2350000	Diallyl ether dioxide; DGE; 2-Epoxypropyl ether; bis (2,3-Epoxypropyl) ether; di(2,3-Epoxypropyl) ether 1 ppm = 5.41 mg/m³	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m³) OSHA 0.1 ppm (0.5 mg/m³)	Ca [25 ppm]	Colorless liquid with a strong, irritating odor.	MW: 130.2 BP: 500°F Sol: ? Fl.P: 147°F IP: ? Sp.Gr(77°F): 1.26 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 26	DIBK; sym-Diisopropyl acetone; 2,6-Dimethyl-4-heptanone; Isovalerone; Valerone 1 ppm = 5.92 mg/m³	NIOSH/OSHA 25 ppm (150 mg/m³)	2000 ppm	Colorless liquid with a mild, sweet odor.	MW: 142.3 BP: 334°F Sol: 0.05% Fl.P: 120°F IP: ? Sp.Gr: 0.81 Class II Combustible Liquid	VP: 2 mm FRZ: -43°F UEL(200°F): 7.1% LEL(200°F): 0.8%	Strong oxidizers	Char; CS_2; GC/FID; III [#1300, Ketones I]

000099

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: *Provide:*	Reason prob *Any poss >5%/Reason prob <5%* Immed contam N.R. Immed non-imperv contam *Eyewash (>5%), quick drench*	NIOSH/OSHA 100 ppm: CCROV*/SA*/SCBA* 250 ppm: SA:CF*/PAPROV* 500 ppm: CCRFOV/PAPRTOV*/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh *Abs* Ing Con	Nau, vomit; irrit resp *sys, skin, eyes*	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, skin, eyes
Clothing: Goggles: Wash: Change: Remove:	*Repeat* Reason prob N.R. N.R. Prompt non-imperv wet	*NIOSH/OSHA* 1000 ppm: SA/SCBA 2500 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: irrit resp sys; CNS symptoms; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Reason prob Immed contam/daily After work if any poss *contam* Immed non-imperv contam Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; skin burns; [carc]; in animals: hemato sys, lung, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, eyes, resp sys
Clothing: Goggles: Wash: Change: Remove:	Repeat N.R. Prompt wet N.R. Prompt non-imperv contam	NIOSH/OSHA 625 ppm: SA:CF*/PAPROV* 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; head, dizz; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, skin, eyes

Diisobutyl ketone

7353

000100

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Diisopropylamine $((CH_3)_2CH)_2NH$ 108-18-9 IM4025000	N-(1-Methylethyl)-2-propanamine	NIOSH/OSHA 5 ppm (20 mg/m³) [skin]	1000 ppm	Colorless liquid with an ammonia- or fish-like odor.	MW: 101.2 BP: 183°F Sol: Slight 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]
1158 68	1 ppm = 4.21 mg/m³							
Dimethyl acetamide $CH_3CON(CH_3)_2$ 127-19-5 AB7700000	N,N-Dimethyl acetamide; DMAC	NIOSH/OSHA 10 ppm (35 mg/m³) [skin]	400 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	Si gel; Methanol; GC/FID; III [#2004]
	1 ppm = 3.62 mg/m³							
Dimethylamine $(CH_3)_2NH$ 124-40-3 IP8750000	Dimethylamine (anhydrous), N-Methylmethanamine	NIOSH/OSHA 10 ppm (18 mg/m³)	2000 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(Liquid) IP: 8.24 eV Sp.Gr: 0.67 (Liquid at 44°F) Class IA Flammable Liquid	VP: >1 atm FRZ: -134°F UEL: 14.4% LEL: 2.8%	Strong oxidizers, chlorine, mercury, acraldehyde, fluoride, maleic anhydride	Si gel; H_2SO_4/ Methanol; GC/FID; III [#2010]
1032 19	1 ppm = 1.87 mg/m³							
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	Yellow, leaf-shaped crystals.	MW: 225.3 BP: Sublimes Sol: Insoluble Fl.P: ? IP: ?	VP: ? MLT: 237°F UEL: ? LEL: ?	None reported	G-chrom P; 2-Propanol; GC/FID; II(4) [P&CAM #284]

000101

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Any poss (soln >5%) Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash (<5%)	NIOSH/OSHA 125 ppm: SA:CF[ε]/PAPROV[ε] 250 ppm: CCRFOV/GMFOV/SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Ing Abs Ing Con	Nau, vomit; head; eye irrit, vis dist; pulm irrit	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 100 ppm: SA/SCBA 250 ppm: SA:CF 400 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Jaun, liver damage; depres, lethargy, halu, delusions; irrit skin	Eye: Irr immed Skin: Water flush immed Swallow: Medical attention immed	Liver, skin
Clothing: Any poss liq/Repeat soln Goggles: Any poss Wash: Immed contam liq/Prompt contam soln Change: N.R. Remove: Immed wet (flamm) Provide: Liq: Eyewash, quick drench	NIOSH/OSHA 250 ppm: SA:CF[ε] 500 ppm: SCBAF/SAF 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit nose, throat; sneezing, cough, dysp; pulm edema; conj; burns skin, muc memb; derm	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Enlarged liver; hepatic and renal dysfunction; contact derm; cough, wheez, difficulty breath; bloody sputum; bronchial secretions; frequent urination, hema, dysuria; (carc)	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Liver, skin, bladder

4-Dimethylaminoazobenzene

7353

000102

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Dimethylaniline $C_6H_5N(CH_3)_2$ 121-69-7 BX4725000 2253 57	N,N-Dimethylaniline; N,N-Dimethylbenzeneamine; N,N-Dimethylphenylamine 1 ppm = 5.04 mg/m³	NIOSH/OSHA 5 ppm (25 mg/m³) ST 10 ppm (50 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(85°F): 1 mm FRZ: 36°F UEL: ? LEL: ?	Strong oxidizers, strong acids, benzoyl peroxide	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate $C_4H_7O_4PBr_2Cl_2$ 300-76-5 TB9450000 2783 55	Dibrom; 1,2-Dibromo-2,2-dichloro-ethyl dimethyl phosphate; Naled $[(CH_3O)_2P(O)OC(Br)-HCBr(Cl_2)]$ 1 ppm = 15.83 mg/m³	NIOSH/OSHA 3 mg/m³ [skin]	1800 mg/m³	Colorless to white solid or straw-colored liquid (above 80°F) with a slightly pungent odor.	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 [Note: Corrosive to metals.]	None available
Dimethylformamide $HCON(CH_3)_2$ 68-12-2 LQ2100000 2265 26	Dimethyl formamide; N,N-Dimethylformamide; DMF 1 ppm = 3.04 mg/m³	NIOSH/OSHA 10 ppm (30 mg/m³) [skin]	3500 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 IIIA Combustible Liquid	VP(77°F): 4 mm FRZ: -78°F UEL: 15.2% LEL(212°F): 2.2%	Carbon tetrachloride; other halogenated compounds when in contact with iron; strong oxidizers; alkyl aluminums; inorganic nitrates	Si gel; Methanol; GC/FID; III [#2004]
1,1-Dimethylhydrazine $(CH_3)_2NNH_2$ 57-14-7 MV2450000 1163 28	Dimazine, DMH, UDMH, Unsymmetrical dimethyl-hydrazine 1 ppm = 2.50 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 [50 ppm] ACGIH A2	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(77°F): 157 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; Reagent; Vis; II(3) [#S143]

000103

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 50 ppm: SA/SCBA 100 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia symptoms: cyan, weak, dizz, ataxia	Eye: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Irr immed Blood, kidneys, liver, CVS
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Eyewash	NIOSH/OSHA 30 mg/m³: DMFu/SA/HiE/SCBA 75 mg/m³: PAPRDMFu/SA:CF 150 mg/m³: HiEF/PAPRTHiE/SAT:CF/SCBAF/SAF 1800 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Miosis, lac; head; tight chest, wheez, lar spasm; salv; cyan; anor, nau, vomit, abdom cramp, diarr; weak, twitch, para; gidd, ataxia, convuls; low BP; card irregularities; irrit skin, eyes	Eye: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Irr immed Resp sys, CNS, CVS, skin, eyes, blood chol
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 100 ppm: SA*/SCBA* 250 ppm: SA:CF* 500 ppm: SCBAF/SAF/SAT:CF* 3500 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit, colic; liver damage, hepatomegaly; high BP; face flush; derm; in animals: kidney, heart damage	Eye: Skin: Breath: Resp support Swallow: Medical attention immed	Irr immed Water flush prompt Liver, kidneys, CVS, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) 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; lethargy; nau; anoxia; convuls; liver inj; [carc]	Eye: Skin: Breath: Resp support Swallow: Medical attention immed	Irr immed Water flush immed CNS, liver, GI tract, blood, resp sys, eyes, skin

7353

000104

97

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Dimethylphthalate $C_6H_4(COOCH_3)_2$ 131-11-3 TI1575000	Dimethyl ester of 1,2-benzenedicarboxylic acid; DMP	NIOSH/OSHA 5 mg/m³	9300 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	VP: 0.01 mm FRZ: 42°F UEL: ? LEL(358°F): 0.9%	Nitrates; strong oxidizers, alkalis & acids	None available
	1 ppm = 8.07 mg/m³				Sp.Gr: 1.19 Class IIIB Combustible Liquid			
Dimethyl sulfate $(CH_3)_2SO_4$ 77-78-1 WS8225000	Dimethyl ester of sulfuric acid, Dimethylsulfate, Methyl sulfate	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m³) [skin] OSHA 0.1 ppm (0.5 mg/m³) [skin]	Ca [10 ppm] ACGIH A2	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: ?	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; II; [#2524]
1595 57	1 ppm = 5.24 mg/m³				Sp.Gr: 1.33 Class IIIA Combustible Liquid			
Dinitrobenzene (all isomers) $C_6H_4(NO_2)_2$ o: 528-29-0 CZ7450000 m: 99-65-0 CZ7350000 p: 100-25-4 CZ7525000	o: ortho-Dinitrobenzene; 1,2-Dinitrobenzene m: meta-Dinitrobenzene; 1,3-Dinitrobenzene p: para-Nitrobenzene; 1,4-Dinitrobenzene	NIOSH/OSHA 1 mg/m³ [skin]	200 mg/m³	Pale white or yellow solids.	MW: 168.1 BP: 606/572/570°F Sol: 0.05/0.02/0.01% Fl.P: 302/302°F/? IP: 10.71/10.43/10.50 eV Sp.Gr(64°F): 1.57/1.58/1.63 Combustible Solids	VP: ?/?/? MLT: 244/192/343°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]
1597 56								
Dinitro-o-cresol $CH_3C_6H_2OH(NO_2)_2$ 534-52-1 GO9625000	4,6-Dinitro-o-cresol; 3,5-Dinitro-2-hydroxy-toluene; 4,6-Dinitro-2-methyl phenol; DN; DNOC	NIOSH/OSHA 0.2 mg/m³ [skin]	5 mg/m³	Yellow, odorless solid. [insecticide]	MW: 198.1 BP: 594°F Sol: 0.01% Fl.P: NA IP: ?	VP: 0.00005 mm MLT: 190°F UEL: NA LEL: NA	Strong oxidizers	Filter/Bub; 2-Propanol; HPLC/UVD; II(5) [#S166]
1598 53					Sp.Gr: 1.1 (estimated) Noncombustible Solid			

000105

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	N.R. Reason prob N.R. N.R. N.R.	NIOSH/OSHA 50 mg/m³: DMF 125 mg/m³: PAPRDM[£]/SA:CF[£] 250 mg/m³: HiEF/SCBAF/SAF 9300 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit upper resp sys, stomach pain	Eye: Skin: Breath: Swallow:	Irr prompt Wash regularly Resp support Medical attention immed	Resp sys, GI tract
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; head; gidd; conj irrit; photo; periorb edema; dysphonia, aphonia, dysphagia, productive cough; chest pain; dysp, cyan; vomit, diarr; dysuria; analgesia; fever; ict; album, hema; skin, eye burns; delirium; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, liver, kidneys, CNS, skin
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Reason prob Immed wet/Prompt contam After work if reason prob contam Immed non-imperv wet/ Prompt non-imperv contam Quick drench	NIOSH/OSHA 5 mg/m³: DM 10 mg/m³: DMXSQ/SA/HiE/SCBA 25 mg/m³: PAPRDM/SA:CF 50 mg/m³: HiEF/PAPRTHiE/SCBAF/ SAF/SAT:CF 200 mg/m³: SA:PD,PP §: 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: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Blood, liver, CVS, eyes, CNS
Clothing: Goggles: Wash: Change: Remove:	Reason prob Reason prob Prompt contam/daily After work if reason prob contam Prompt non-imperv contam	NIOSH/OSHA 2 mg/m³: DMF 5 mg/m³: PAPRDM[£]/SA:CF[£]/HiEF/ 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: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CVS, endocrine sys, eyes

Dinitro-o-cresol

7353

000106

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Dinitrotoluene $C_6H_3CH_3(NO_2)_2$ 25321-14-6 XT1300000 1600 56 (liquid) 2038 56 (solid)	Dinitrotoluol, DNT, Methyldinitrobenzene	NIOSH Ca See Appendix A 1.5 mg/m³ [skin] OSHA 1.5 mg/m³ [skin]	Ca [200 mg/m³]	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.]	None available
Di-sec octyl phthalate $C_{24}H_{38}O_4$ 117-81-7 TI0350000	DEHP, DOP, bis-(2-Ethylhexyl) phthalate, di(2-Ethylhexyl) phthalate, Octyl phthalate $[C_6H_4(COOCH_2CH(C_2H_5)C_4H_9)_2]$ 1 ppm = 16.23 mg/m³	NIOSH Ca See Appendix A 5 mg/m³ ST 10 mg/m³ OSHA 5 mg/m³ ST 10 mg/m³	Ca [Unknown]	Colorless, oily liquid with a slight odor.	MW: 390.5 BP: 727°F Sol: Insoluble 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; III [#5020, di(2-Ethylhexyl) phthalate]
Dioxane $C_4H_8O_2$ 123-91-1 JG8225000 1165 26	Diethylene dioxide; Diethylene ether; Dioxan; p-Dioxane; 1,4-Dioxane 1 ppm = 3.66 mg/m³	NIOSH Ca See Appendix A C 1 ppm (3.6 mg/m³) [30-min] OSHA 25 ppm (90 mg/m³) [skin]	Ca [2000 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, triethynyl aluminum	Char; CS_2; GC/FID; III [#1602]
Diphenyl $C_6H_5C_6H_5$ 92-52-4 DU8050000	Biphenyl, Phenyl benzene	NIOSH/OSHA 1 mg/m³ (0.2 ppm)	300 mg/m³	Colorless to pale-yellow solid with a pleasant, characteristic odor.	MW: 154.2 BP: 489°F Sol: Insoluble Fl.P: 235°F IP: 7.95 eV Sp.Gr: 1.04 Combustible Solid	VP(160°F): 1 mm MLT: 156°F UEL(311°F): 5.8% LEL(232°F): 0.6%	Oxidizers	Tenax GC; CCl₄; GC/FID; III [#2530, Biphenyl]

000107

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss molt/Repeat liq Any poss molt Immed wet/Prompt contam/daily After if reason prob contam Immed non-imperv wet/ Prompt non-imperv contam Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Anoxia, cyan; anemia, jaun; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Blood, liver, CVS
Clothing: Goggles: Wash: Change: Remove:	N.R. N.R. N.R. N.R. N.R.	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con Ing	Irrit eyes, muc memb; [carc]	Eye: Skin: Breath: Swallow:	Irr immed (Not a dermal hazard) Resp support Medical attention immed	Eyes, upper resp sys, GI tract
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt contam N.R. Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Drow, head; nau, vomit; irrit eyes, nose, throat; liver damage; kidney failure; skin irrit; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water wash prompt Resp support Medical attention immed	Liver, kidney, skin, eyes
Clothing: Goggles: Wash: Change: Remove:	Repeat Any poss molt/Repeat otherwise Prompt contam After work if reason prob contam Prompt non-imperv contam	NIOSH/OSHA 10 mg/m³: CCROVDM/SA/SCBA 25 mg/m³: SA:CF/PAPROVDM* 50 mg/m³: CCRFOVHIE/SCBAF/SAF/ GMFOVHIE/PAPRTOVHIE* 300 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit throat, eyes; head, nau, flg, numb limbs; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Liver, skin, CNS, upper resp sys, eyes
Diphenyl							

7353

000108

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Dipropylene glycol methyl ether $CH_3OC_3H_6OC_3H_6OH$ 34590-94-8 JM1575000	Dipropylene glycol monomethyl ether, Dowanol® 50B 1 ppm = 6.16 mg/m³	NIOSH/OSHA 100 ppm (600 mg/m³) ST 150 ppm (900 mg/m³) [skin]	Unknown	Colorless liquid with a mild, ether-like odor.	MW: 148.2 BP: 374°F Sol: Miscible Fl.P: 180°F IP: ? Sp.Gr: 0.95 Class IIIA Combustible Liquid	VP(79°F): 0.4 mm FRZ: -112°F UEL: ? LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; II(2) [#S69]
Endrin $C_{12}H_8Cl_6O$ 72-20-8 I01575000 2761 55	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-dimethano-naphthalene; Hexadrin	NIOSH/OSHA 0.1 mg/m³ [skin]	2000 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	Filter/ Chrom-102; Toluene; GC/ECD; III [#5519]
Epichlorohydrin C_3H_5OCl 106-89-8 TX4900000 2023 30	1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; gamma-Chloropropylene oxide 1 ppm = 3.85 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 2 ppm (8 mg/m³) [skin]	Ca [250 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; CS_2; GC/FID; III [#1010]
EPN $C_2H_5O(C_6H_5)P(S)$-$OC_6H_4NO_2$ 2104-64-5 TB1925000	O-Ethyl O-P-nitrophenyl benzenephosphonothioate, O-Ethyl O-P-nitrophenyl benzenethiophosphonate	NIOSH/OSHA 0.5 mg/m³ [skin]	50 mg/m³	Yellow solid with an aromatic odor. [Note: A brown liquid above 97°F.] [pesticide]	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; III [#5012]

000109

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 1000 ppm: SA/SCBA 2500 ppm: SA:CF 5000 ppm: SCBAF/SAF/SAT:CF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; weak, li-head, head	Eye: Skin: Breath: Swallow:	Irr immed Water wash prompt Resp support Medical attention immed	Resp sys, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 1 mg/m³: CCROVDMFu/SA/SCBA 2.5 mg/m³: SA:CF/PAPROVDMFu 5 mg/m³: CCRFOVHiE/SCBAF/SAF/GMFOVHiE/PAPRTOVHiE/SAT:CF 100 mg/m³: SA:PD,PP 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Epileptiform convuls; stupor, head, dizz; abdom discomfort, nau, vomit; insom; aggressiveness, conf; lethargy, weak; anor; in animals: liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, liver
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVAG/SCBAE	Inh Abs Ing Con	Nau, vomit; abdom pain; resp distress, cough; cyan; irrit eyes, skin with deep pain; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, skin, kidneys
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 5 mg/m³: SA/SCBA 12.5 mg/m³: SA:CF 25 mg/m³: SCBAF/SAF/SAT:CF 50 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Miosis, lac, rhin; head; tight chest, wheez, lar spasm; salv; cyan; anor, nau, abdom cramp, diarr; para, convuls; low BP; card irregularities; irrit skin, eyes	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, CVS, CNS, eyes, skin, blood chol

EPN

7353

000110

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW; BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Ethanolamine $NH_2CH_2CH_2OH$ 141-43-5 KJ5775000	2-Aminoethanol, beta-Aminoethyl alcohol, Ethylolamine, 2-Hydroxyethylamine, Monoethanolamine	NIOSH/OSHA 3 ppm (8 mg/m³) ST 6 ppm (15 mg/m³)	1000 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: 185°F IP: 8.96 eV	VP: 0.4 mm FRZ: 51°F UEL: ? LEL: ?	Strong oxidizers, strong acids	Si gel; Methanol/ Water; GC/FID; III [#2007, Amino-ethanol Com-pounds]
2491 60	1 ppm = 2.54 mg/m³				Sp.Gr: 1.02 Class IIIA Combustible Liquid			
2-Ethoxyethanol $C_2H_5OCH_2CH_2OH$ 110-80-5 KK8050000	Cellosolve®, EGEE, Ethylene glycol monoethyl ether	NIOSH Reduce exposure to lowest feasible concentration. OSHA 200 ppm (740 mg/m³) [skin]	* [6000 ppm] *Not applicable because of the NIOSH REL.	Colorless liquid with a sweet, pleasant, ether-like odor.	MW: 90.1 BP: 275°F Sol: Miscible Fl.P: 110°F IP: ?	VP: 4 mm FRZ: -130°F UEL(200°F): 15.6% LEL(200°F): 1.7%	Strong oxidizers	Char/ CH_2Cl_2; Methanol; GC/FID; III [#1403, Alcohols IV]
1171 26	1 ppm = 3.75 mg/m³				Sp.Gr: 0.93 Class II Combustible Liquid			
2-Ethoxyethyl acetate $CH_3COOCH_2CH_2OC_2H_5$ 111-15-9 KK8225000	Cellosolve® acetate, EGEEA, Ethylene glycol monoethyl ether acetate, Glycol monoethyl ether acetate	NIOSH Reduce exposure to lowest feasible concentration. OSHA 100 ppm (540 mg/m³) [skin]	* [2500 ppm] *Not applicable because of the NIOSH REL.	Colorless liquid with a mild odor.	MW: 132.2 BP: 313°F Sol: 23% Fl.P: 124°F IP: ?	VP: 2 mm FRZ: -79°F UEL: ? LEL: 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
1172 26	1 ppm = 5.49 mg/m³				Sp.Gr: 0.98 Class II Combustible Liquid			
Ethyl acetate $CH_3COOC_2H_5$ 141-78-6 AH5425000	Acetic ester, Acetic ether, Ethyl ester of acetic acid, Ethyl ethanoate	NIOSH/OSHA 400 ppm (1400 mg/m³)	10,000 ppm	Colorless liquid with an ether-like, fruity odor.	MW: 88.1 BP: 171°F Sol(77°F): 10% Fl.P: 24°F IP: 10.01 eV	VP: 74 mm FRZ: -117°F UEL: 11.5% LEL: 2.0%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; II(2) [#S49]
1173 26	1 ppm = 3.66 mg/m³				Sp.Gr: 0.90 Class IB Flammable Liquid			

000111

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 30 ppm: SA*/SCBA*/CCRS* 75 ppm: SA:CF*/PAPRS* 150 ppm: CCRFS/GMFS/SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Resp sys, skin, eye irrit; lethargy	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals: pulm irrit; hematologic effects; liver, kidneys, lung damage, irrit eyes	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	In animals: lungs, eyes, blood, kidneys, liver
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; vomit; kidney damage; para	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, eyes, GI tract
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCRFOV/PAPROV[£] 10,000 ppm: GMFOV/SCBAF/SAF/SA:CF[£] §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys

Ethyl acetate

7353

000112

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Ethyl acrylate CH_2=$CHCOOC_2H_5$ 140-88-5 AT0700000 1917 27	Ethyl acrylate (inhibited), Ethyl ester of acrylic acid, Ethyl propenoate 1 ppm = 4.16 mg/m³	NIOSH Ca See Appendix A OSHA 5 ppm (20 mg/m³) ST 25 ppm (100 mg/m³) [skin]	Ca [2000 ppm]	Colorless liquid with an acrid odor.	MW: 100.1 BP: 211°F Sol: 2% Fl.P: 48°F IP: ? 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; III [#1450, Esters I]
Ethylamine $CH_3CH_2NH_2$ 75-04-7 KH2100000 1036 68	Aminoethane, Ethylamine (anhydrous), Monoethylamine 1 ppm = 1.87 mg/m³	NIOSH/OSHA 10 ppm (18 mg/m³)	4000 ppm	Colorless gas or water-white liquid (below 62°F) with an ammonia-like odor. [Note: Shipped as a liquefied compressed gas.]	MW: 45.1 BP: 62°F Sol: Miscible Fl.P: 1°F IP: 8.86 eV Sp.Gr: 0.69 (Liquid) Flammable Gas Class IA Flammable Liquid	VP: >1 atm FRZ: -114°F UEL: 14.0% LEL: 3.5%	Strong acids; strong oxidizers; copper, tin & zinc in presence of moisture; cellulose nitrate	Si gel; H_2SO_4; GC/FID; II(3) [#S144]
Ethyl benzene $CH_3CH_2C_6H_5$ 100-41-4 DA0700000 1175 26	Ethylbenzol, Phenylethane 1 ppm = 4.41 mg/m³	NIOSH/OSHA 100 ppm (435 mg/m³) ST 125 ppm (545 mg/m³)	2000 ppm	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 277°F Sol: 0.01% Fl.P: 55°F IP: 8.76 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP(79°F): 10 mm FRZ: -139°F UEL: 6.7% LEL: 1.0%	Strong oxidizers	Char; CS_2; GC/FID; III [#1501, Aromatic Hydro-carbons]
Ethyl bromide CH_3CH_2Br 74-96-4 KH6475000 1891 58	Bromoethane 1 ppm = 4.53 mg/m³	NIOSH See Appendix D OSHA 200 ppm (890 mg/m³) ST 250 ppm (1110 mg/m³)	3500 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(70°F): 400 mm FRZ: -182°F UEL: 8.0% LEL: 6.8%	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char; 2-Propanol; GC/FID; III [#1011]

000113

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, resp sys, skin; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, eyes, skin
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet/immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 250 ppm: SA:CF[ξ]/PAPRS[ξ] 500 ppm: CCRFS/GMFS/SCBAF/SAF 4000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes; burns skin; resp irrit; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/SA*/SCBA*/CCROV* 2000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; derm; narco, coma	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, upper resp sys, skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	OSHA 2000 ppm: SA/SCBA 3500 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys, skin; CNS depres; pulm edema; liver, kidney disease; card arrhy; card arrest	Eye: Skin: Breath: Swallow:	Irr immed Soap flush prompt Resp support Medical attention immed	Skin, liver, kidneys, resp sys, CVS, CNS

Ethyl bromide

7353

000114

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Ethyl butyl ketone $CH_3CH_2CO(CH_2)_3CH_3$ 106-35-4 MJ5250000	Butyl ethyl ketone, 3-Heptanone	NIOSH/OSHA 50 ppm (230 mg/m³)	3000 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; III [#1301, Ketones II]
	1 ppm = 4.75 mg/m³							
Ethyl chloride CH_3CH_2Cl 75-00-3 KH7525000	Chloroethane, Hydrochloric ether, Monochloroethane, Muriatic ether	NIOSH See Appendix D Handle with caution in the workplace. OSHA 1000 ppm (2600 mg/m³)	20,000 ppm	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) IP: 10.97 eV. Sp.Gr: 0.92 (Liquid at 32°F) Flammable Gas Class IA Flammable Liquid	VP: >1 atm 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; III [#2519]
1037 27	1 ppm = 2.68 mg/m³							
Ethylene chlorohydrin CH_2ClCH_2OH 107-07-3 KK0875000	2-Chloroethanol, 2-Chloroethyl alcohol, Ethylene chlorhydrin	NIOSH/OSHA C 1 ppm (3 mg/m³) [skin]	10 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; III [#2513]
1135 55	1 ppm = 3.35 mg/m³							
Ethylenediamine $NH_2CH_2CH_2NH_2$ 107-15-3 KH8575000	1,2-Diaminoethane; 1,2-Ethanediamine; Ethylenediamine (anhydrous)	NIOSH/OSHA 10 ppm (25 mg/m³)	2000 ppm	Colorless, viscous liquid with an ammonia-like odor. [Note: A solid below 47°F.] [fungicide]	MW: 60.1 BP: 241°F Sol: Miscible Fl.P: 93°F IP: 8.60 eV Sp.Gr: 0.91 Class IC Flammable Liquid	VP: 11 mm FRZ: 47°F UEL: 14.4% LEL: 4.2%	Strong acids & oxidizers, carbon tetrachloride & other chlorinated organic compounds, carbon disulfide [Note: Corrosive to metals.]	XAD-2*; DMF; HPLC/UVD; III [#2540]
1604 29	1 ppm = 2.50 mg/m³							

000115

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 3000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narco, coma; derm	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	OSHA 10,000 ppm: SA*/SCBA* 20,000 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Inco, inebriate; abdom cramps; card arrhy, card arrest; liver, kidney damage	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Liver, kidneys, resp sys, CVS
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: SCBA*/SA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit muc memb; nau, vomit; vertl, inco; numb; vis dist; head; thirst; delirium; low BP; collapse, shock, coma	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, liver, kidneys, CNS, skin, CVS
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed wet/immed non-imperv contam Provide: Eyewash (>5%), quick drench	NIOSH/OSHA 250 ppm: SA:CF[ε]/PAPRS[ε] 500 ppm: CCRFS/GMFS/SCBAF/SAF 2000 ppm: SAF:PD,PP §: SCBAF: PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Nasal irrit; primary irrit; sens derm, irrit resp sys, asthma; liver, kidney damage	Eye: Skin: Irr immed Breath: Water flush immed Swallow: Resp support Medical attention immed		Resp sys, liver, kidneys, skin

Ethylenediamine

7353

000116

Chemical name, structure/formula, CAS and RTECS Nos., and 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 dibromide $BrCH_2CH_2Br$ 106-93-4 KH9275000 1605 55	1,2-Dibromoethane; Ethylene bromide; Glycol dibromide 1 ppm = 7.81 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 [400 ppm] ACGIH A2 [skin]	Colorless liquid or solid (below 50°F) with a sweet odor.	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; III [#1008]
Ethylene dichloride $ClCH_2CH_2Cl$ 107-06-2 KI0525000 1184 26	1,2-Dichloroethane; Ethylene chloride; Glycol dichloride 1 ppm = 4.11 mg/m³	NIOSH Ca See Appendix A 1 ppm (4 mg/m³) ST 2 ppm (8 mg/m³) OSHA 1 ppm (4 mg/m³) ST 2 ppm (8 mg/m³)	Ca [1000 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 aluminum or magnesium powder, sodium & potassium; liquid ammonia [Note: Decomposes to vinyl chloride & HCl above 1112°F.]	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
Ethylene glycol dinitrate $O_2NOCH_2CH_2ONO_2$ 628-96-6 KW5600000 1 ppm = 6.12 mg/m³	EGDN; 1,2-Ethanediol dinitrate; Ethylene dinitrate; Ethylene nitrate; Glycol dinitrate; Nitroglycol	NIOSH/OSHA ST 0.1 mg/m³ [skin] [Note: OSHA stayed the start-up date of the PEL on 12/6/89 for the explosives industry until 2/1/90.]	500 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; III [#2507]
Ethyleneimine C_2H_5N 151-56-4 KX5075000 1185 30 (inhibited)	Aminoethylene, Azirane, Aziridine, Dimethyleneimine, Dimethylenimine, Ethylenimine, Ethylimine 1 ppm = 1.79 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1012] See Appendix B	Ca [100 ppm]	Colorless liquid with an ammonia-like odor.	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: 46% LEL: 3.6%	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; II(5) [P&CAM #300]

000117

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit resp sys, eyes; derm with vesic; [carc]	Eye: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Irr immed	Resp sys, liver, kidneys, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Abs Con	CNS depres; nau, vomit; derm; irrit eyes, corneal opacity; [carc]	Eye: Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Irr immed	Kidneys, liver, eyes, skin, CNS
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed wet (flamm) Provide: Quick drench	NIOSH/OSHA 1 mg/m³: SA*/SCBA* 2.5 mg/m³: SA:CF* 5 mg/m³: SCBAF/SAF/SAT:CF* 200 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; methemoglobinemia; delirium, depres CNS; angina; skin irrit; in animals: anemia; mild liver, kidney damage	Eye: Skin: Breath: Swallow: Medical attention immed	Irr immed Soap wash immed Resp support	CVS, blood, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Con Ing	Nau, vomit; head, dizz; pulm edema; liver, kidney damage; eye burns; skin sens; irrit nose, throat; [carc]	Eye: Skin: Breath: Swallow: Medical attention immed	Irr immed (15 min) Soap wash immed Resp support	Eyes, lungs, skin, liver, kidneys
Ethyleneimine						

7353

111

00118

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Ethylene oxide C_2H_4O 75-21-8 KX2450000 1040 69	Dimethylene oxide; 1,2-Epoxy ethane; Oxirane 1 ppm = 1.83 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] ACGIH 1 ppm A2 5 ppm [15-min Excursion]	Ca [800 ppm]	Colorless gas or liquid (below 51°F) with an ether-like odor.	MW: 44.1 BP: 51°F Sol: Miscible Fl.P(oc): -20°F IP: 10.56 eV Sp.Gr: 0.82 (Liquid at 50°F) Class IA Flammable Liquid	VP: >1 atm FRZ: -171°F UEL: 100% LEL: 3.0%	Strong acids, alkalis & oxidizers; chlorides of iron, aluminum & tin; oxides of iron & aluminum	Char(pet)*; DMF; GC/ECD; III [#1614]
Ethyl ether $C_2H_5OC_2H_5$ 60-29-7 KI5775000 1155 26	Diethyl ether, Ethyl oxide, Ether, Diethyl oxide, Solvent ether 1 ppm = 3.08 mg/m³	NIOSH See Appendix D OSHA 400 ppm (1200 mg/m³) ST 500 ppm (1500 mg/m³)	19,000 ppm [LEL]	Colorless liquid with a pungent, sweetish odor. [Note: A gas above 84°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 [Note: Tends to form explosive peroxides under influence of air & light.]	Char; Ethyl acetate; GC/FID; III [#1610]
Ethyl formate CH_3CH_2OCHO 109-94-4 LQ8400000 1190 26	Ethyl ester of formic acid, Ethyl methanoate 1 ppm = 3.08 mg/m³	NIOSH/OSHA 100 ppm (300 mg/m³)	8000 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 & formic acid.]	Char; CS_2; GC/FID; II(2) [#S36]
Ethyl mercaptan CH_3CH_2SH 75-08-1 K19625000 2363 27	Ethanethiol, Ethyl sulfhydrate, Mercaptoethane 1 ppm = 2.58 mg/m³	NIOSH C 0.5 ppm (1.3 mg/m³) [15-min] OSHA 0.5 ppm (1 mg/m³)	2500 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.]	None available

000119

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Any poss	NIOSH	Inh	Irrit eyes, nose, throat;	Eye:	Irr immed	Eyes, blood, resp
Goggles:	Reason prob	5 ppm: GMFS[†]/SCBAF/SAF	Ing	pecullar taste; head; nau,	Skin:	Water flush immed	sys, liver, CNS,
Wash:	Immed contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	vomit, diarr; dysp, cyan,	Breath:	Resp support	kidneys
Change:	N.R.	Escape: GMFS[†]/SCBAE		pulm edema; drow, weak,	Swallow:	Medical attention	
Remove:	Immed wet (flamm)			inco; EKG abnormalities;		immed	
Provide:	Eyewash			burns eyes, skin; frostbite;			
				[carc];			
				In animals: convuls; liver,			
				kidney damage			
Clothing:	Repeat	OSHA	Inh	Dizz; drow; head,	Eye:	Irr immed	CNS, skin, resp
Goggles:	Reason prob	1000 ppm: CCROV*/PAPROV*	Ing	excited, narco; nau,	Skin:	Water wash prompt	sys, eyes
Wash:	N.R.	4000 ppm: SA*/SCBA*	Con	vomit; irrit eyes, upper	Breath:	Resp support	
Change:	N.R.	10,000 ppm: SA:CF*		resp sys, skin	Swallow:	Medical attention	
Remove:	Immed wet (flamm)	19,000 ppm: GMFOV/SCBAF/SAF				immed	
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
Clothing:	Repeat	NIOSH/OSHA	Inh	Irrit eyes, upper resp sys;	Eye:	Irr immed	Eyes, resp sys
Goggles:	Reason prob	1000 ppm: CCRFOV/PAPROV[ε]	Ing	narco	Skin:	Water flush immed	
Wash:	Prompt wet	2500 ppm: SA:CF[ε]	Con		Breath:	Resp support	
Change:	N.R.	5000 ppm: GMFOV/SCBAF/SAF			Swallow:	Medical attention	
Remove:	Any wet immed (flamm)	8000 ppm: SAF:PD,PP				immed	
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
Clothing:	Repeat	NIOSH/OSHA	Inh	Head, nau, irrit muc memb;	Eye:	Irr immed	Resp sys;
Goggles:	Reason prob	5 ppm: SA/SCBA/CCROV	Ing	in animals: inco; weak;	Skin:	Soap wash immed	in animals:
Wash:	Prompt contam	12.5 ppm: SA:CF/PAPROV	Con	pulm irrit; liver, kidney	Breath:	Resp support	liver, kidneys
Change:	N.R.	25 ppm: SCBAF/SAF/GMFOV/PAPRTOV/		damage; cyan	Swallow:	Medical attention	
Remove:	Immed wet (flamm)	CCRFOV/SAT:CF				immed	
		500 ppm: SA:PD,PP					
		1000 ppm: SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					

Ethyl mercaptan

7353

000120

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
N-Ethylmorpholine $C_4H_8ONCH_2CH_3$ 100-74-3 QE4025000	4-Ethylmorpholine 1 ppm = 4.79 mg/m³	NIOSH/OSHA 5 ppm (23 mg/m³) [skin]	2000 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 29	Ethyl orthosilicate, Ethyl silicate (condensed), Tetraethoxysilane, Tetraethyl silicate 1 ppm = 8.66 mg/m³	NIOSH/OSHA 10 ppm (85 mg/m³)	1000 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]
Ferbam $((CH_3)_2NCS_2)_3Fe$ 14484-64-1 NO8750000	tris(Dimethyldithio-carbamate)iron, Ferric dimethyl dithio-carbamate	NIOSH/OSHA 10 mg/m³	N.E.	Dark brown to black, odorless solid. [fungicide]	MW: 416.5 BP: Decomposes Sol: 0.01% Fl.P: ? IP: 7.72 eV Combustible Solid	VP: Low MLT: >356°F (Decomposes) UEL: ? LEL: ?	Strong oxidizers	None available
Ferrovanadium dust FeV 12604-58-9 LK2900000	None	NIOSH/OSHA 1 mg/m³ ST 3 mg/m³	N.E.	Dark, odorless particulate dispersed in air. [Note: Ferro-vanadium metal is an alloy usually containing 50-80% vanadium.]	MW: 106.8 BP: ? Sol: Insoluble Fl.P: NA IP: NA Noncombustible Solid, but dust may be an explosion hazard.	VP: 0 mm (approx) MLT: 2696 to 2768°F UEL: NA LEL: NA	Strong oxidizers	Filter; Acid; AA; OSHA [#ID121, #ID125G]

000121

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash (>15%), quick drench	NIOSH/OSHA 50 ppm: SA*/SCBA*/CCROV* 125 ppm: SA:CF*/PAPROV* 250 ppm: SCBAF/SAF/CCRFOV/ GMFOV/PAPRTOV*/SAT:CF* 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Eye, nose, throat irrit; vis dist; severe eye irrit from splashes	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 100 ppm: SA*/SCBA* 250 ppm: SA:CF* 500 ppm: SCBAF/SAF 1000 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	Resp sys, liver, kidneys, blood, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-Imperv contam	NIOSH/OSHA 50 mg/m³: D 100 mg/m³: DXSQ*/SA*/SCBA*/HIE* 250 mg/m³: PAPRD*/SA:CF* 500 mg/m³: HIEF/SCBAF/SAF/ PAPRTHIE*/SAT:CF* 5000 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: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, skin, GI tract
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 5 mg/m³: DM* 10 mg/m³: D XSQ*/SA*/SCBA* 25 mg/m³: PAPRDM*/SA:CF* 50 mg/m³: HIEF/SCBAF/SAF/ PAPRTHIE*/SAT:CF* 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, pneumitis	Eye: Breath:	Irr immed Resp support	Resp sys, eyes

Ferrovanadium dust

7353

000122

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Fluorides (as F) 1: NaF 2: Na_3AlF_6 1: 7681-49-4/ WB0350000 2: 15096-52-3/ WA9625000 1690 54 (NaF)	1: Sodium fluoride, Floridine 2: Cryolite, Cryocide, Cryodust, Sodium aluminum fluoride, Sodium hexafluoroaluminate Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 2.5 mg/m^3	500 mg/m^3	1: Odorless white powder or colorless crystals. [Note: Pesticide grade is often dyed blue.] 2: Colorless to dark odorless solid. [Note: Loses color on heating.] [pesticide]	MW: 42.0/209.9 BP: 3099°F/ Decomposes Sol: 4/0.04% Fl.P: NA/NA IP: NA/NA Sp.Gr: 2.78/2.90 Noncombustible Solids	VP: 0/0 mm (approx) MLT: 1819/ 1832°F UEL: NA/NA LEL: NA/NA	Strong oxidizers	None available
Fluorine F_2 7782-41-4 LM6475000 9192 25 (cryogenic liquid) 1045 20 (compressed)	Fluorine-19 1 ppm = 1.58 mg/m^3	NIOSH/OSHA 0.1 ppm (0.2 mg/m^3)	25 ppm	Pale yellow to greenish gas with a pungent, irritating odor.	MW: 38.0 BP: -307°F Sol: Reacts Fl.P: NA IP: 15.70 eV 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 1078 12 (gas)	Freon® 11, Monofluorotrichloromethane, Trichlorofluoromethane, Trichloromonofluoromethane, Refrigerant 11 1 ppm = 5.71 mg/m^3	NIOSH/OSHA C 1000 ppm (5600 mg/m^3)	10,000 ppm	Colorless to water-white, nearly odorless liquid or gas (above 75°F).	MW: 137.4 BP: 75°F Sol(77°F): 0.1% Fl.P: NA IP: 11.77 eV Sp.Gr: 1.47 (Liquid at 75°F) Noncombustible Liquid	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; III [#1006, Trichloro-fluoro-methane]
Formaldehyde HCHO 50-00-0 LP8925000 1198 29 (formalin) 2209 29 (formalin)	1) Gaseous form: Methanal, Methyl aldehyde, Methylene oxide 2) Aqueous solution: Formalin (30 to 50% formaldehyde by weight, which usually contains 6 to 12% methanol)	NIOSH Ca See Appendix A 0.016 ppm C 0.1 ppm [15-min] OSHA [1910.1048] 1 ppm ST 2 ppm	Ca [30 ppm] ACGIH A2	Nearly colorless gas with a pungent, suffocating odor. [Note: Often used in an aqueous solution.]	MW: 30.0 BP: -6/207 to 214°F Sol: Miscible Fl.P: NA(Gas)/ 140-185°F IP: 10.88 eV/? Sp.Gr(77°F): 1.08-1.10 (Formalin) Flammable Gas Class IIIB Combustible Liquid (Formalin)	VP: >1 atm/ 1 mm FRZ: -134°F/? UEL: 73%/? LEL: 7.0%/?	Strong oxidizers, alkalis & acids; phenols; urea [Note: Pure formaldehyde has a tendency to polymerize.]	Filter/Imp(2); none; Vis; III [#3500] [Note: Also XAD-2*; Toluene; GC/FID; #2541.]

000123

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	Repeat Any poss Prompt contam After work if any poss contam Promptly non-imperv contam	NIOSH/OSHA 12.5 mg/m³: DM 25 mg/m³: DMXSQ*/SA*/SCBA* 62.5 mg/m³: PAPRDM*†/SA:CF* 125 mg/m3: SCBAF/SAF/HIEF† 500 mg/m3: 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; excess salv, thirst, sweat; stiff spine; derm; calcification of ligaments of ribs, pelvis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Fresh air, art resp Medical attention immed	Eyes, resp sys, CNS, skeleton, kidneys, skin
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH/OSHA 1 ppm: SA*/SCBA* 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 tract; lar spasm, bron spasm; pulm edema; eyes, skin burns; in animals: liver, kidney damage	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	Resp sys, eyes, skin; in animals: liver, kidneys
Clothing: Goggles: Wash: Change: Remove: Provide:	Repeat Any poss N.R. N.R. Prompt non-imperv wet Eyewash, quick drench	NIOSH/OSHA 10,000 ppm: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Inco, tremors; derm; frostbite; card arrhy, card arrest	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CVS, skin
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; lac, burns nose, cough; bron spasm, pulm irrit; derm; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, eyes, skin

7353

117

000124

Formaldehyde

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Formic acid HCOOH 64-18-6 LQ4900000 1779 60	Formic acid, 85-95% in aqueous solution; Hydrogencarboxylic acid; Methanoic acid 1 ppm = 1.91 mg/m³	NIOSH/OSHA 5 ppm (9 mg/m³)	30 ppm	Colorless liquid with a pungent, penetrating odor. [Note: Often used in an aqueous solution. The 90% solution freezes at 20°F.]	MW: 46.0 BP: 224°F (90% soln) Sol: Miscible Fl.P(oc): 122°F (90% soln) IP: 11.05 eV Sp.Gr: 1.22 (90% soln) Class IIIA Combustible Liquid	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.]	Filter/ Chrom-103 (2); Water; IC; II(5) [#S173]
Furfural C_4H_3OCHO 98-01-1 LT7000000 1199 29	Fural, 2-Furfuraldehyde, 2-Furancarboxaldehyde, Furfuraldehyde 1 ppm = 3.99 mg/m³	NIOSH See Appendix D OSHA 2 ppm (8 mg/m³) [skin]	250 ppm	Colorless to amber liquid with an almond-like odor. [Note: Darkens in light and air.]	MW: 96.1 BP: 323°F Sol: 8% Fl.P: 140°F IP: 9.21 eV Sp.Gr: 1.16 Class IIIA Combustible Liquid	VP(66°F): 1 mm FRZ: -34°F UEL: 19.3% LEL: 2.1%	Strong acids, oxidizers, strong alkalis	XAD-2*; Toluene; GC/FID; III [#2529]
Furfuryl alcohol $C_4H_3OCH_2OH$ 98-00-0 LU9100000 2874 55	2-Furylmethanol, 2-Hydroxymethylfuran 1 ppm = 4.08 mg/m³	NIOSH/OSHA 10 ppm (40 mg/m³) ST 15 ppm (60 mg/m³) [skin]	250 ppm	Amber liquid with a faint, burning odor.	MW: 98.1 BP: 338°F Sol: Miscible Fl.P: 149°F IP: ? Sp.Gr: 1.13 Class IIIA Combustible Liquid	VP(89°F): 1 mm FRZ: 6°F UEL: 16.3% LEL: 1.8%	Strong oxidizers & acids [Note: Contact with organic acids may lead to polymerization.]	Porapak-Q; Acetone; GC/FID; III [#2505]
Glycidol $C_3H_6O_2$ 556-52-5 UB4375000	2,3-Epoxy-1-propanol; Epoxypropyl alcohol; Hydroxymethyl ethylene oxide; 2-Hydroxymethyl oxiran; 3-Hydroxypropylene oxide 1 ppm = 3.08 mg/m³	NIOSH/OSHA 25 ppm (75 mg/m³)	500 ppm	Colorless liquid.	MW: 74.1 BP: 320°F (Decomposes) Sol: Miscible Fl.P: 162°F IP: ? Sp.Gr: 1.12 Class IIIA Combustible Liquid	VP(77°F): 0.9 mm FRZ: -49°F UEL: ? LEL: ?	Strong oxidizers, nitrates	Char; THF; GC/FID; III [#1608]

000125

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Any poss	NIOSH/OSHA	Inh	Eye irrit, lac; nasal	Eye:	Irr immed	Resp sys, skin,
Goggles:	Any poss	30 ppm: SA*/SCBA*	Ing	*discharge; throat irrit,*	Skin:	Water flush immed	kidneys, *liver,*
Wash:	Immed contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	cough, dysp; nau; skin	Breath:	Resp support	eyes
Change:	N.R.	Escape: GMFOVHIE/SCBAE		burns, derm	Swallow:	Medical attention immed	
Remove:	Immed non-imperv contam						
Provide:	Eyewash, quick *drench*						
Clothing:	Repeat	OSHA	Inh	Irrit eyes, upper resp	Eye:	Irr immed	Eyes, *resp sys,*
Goggles:	*Reason prob*	20 ppm: CCROV*/SA*/SCBA*	Abs	sys; head; derm	Skin:	Water flush prompt	skin
Wash:	Prompt contam	50 ppm: SA:CF*/PAPROV*	Ing		Breath:	Resp support	
Change:	N.R.	100 ppm: CCRFOV/GMFOV/SCBAF/ SAF/PAPRTOV*/SAT:CF*	Con		Swallow:	Medical attention immed	
Remove:	Prompt non-imperv contam	250 ppm: SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
Clothing:	Reason prob	NIOSH/OSHA	Inh	Dizz; *nau, diarr; diuresis;*	Eye:	Irr immed	Resp sys
Goggles:	Reason prob	100 ppm: PAPROV*/SCBA*/SA*/CCROV*	Abs	resp, body temperature,	Skin:	Water flush immed	
Wash:	Immed contam	250 ppm: PAPRTOV*/SA:CF*/CCRFOV/ GMFOV/SCBAF/SAF	Ing	depres; vomit;	Breath:	Resp support	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	*in animals: eye irrit, drow*	Swallow:	Medical attention immed	
Remove:	Immed non-imperv contam	Escape: GMFOV/SCBAE					
Provide:	Quick drench						
Clothing:	Repeat	NIOSH/OSHA	Inh	Irrit eyes, nose, throat,	Eye:	Irr immed	Eyes, skin, resp
Goggles:	Reason prob	250 ppm: SA*/SCBA*	Ing	skin; narco	Skin:	Water wash prompt	sys, CNS
Wash:	Prompt contam	500 ppm: SA:CF*/SCBAF/SAF	Con		Breath:	Resp support	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Swallow:	Medical attention immed	
Remove:	Prompt non-imperv contam	Escape: GMFOV/SCBAE					

7353

000126

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Graphite (natural) C 7782-42-5 MD9659600	Black lead, Mineral carbon, Plumbago, Silver graphite, Stove black	NIOSH/OSHA 2.5 mg/m³ (resp)	N.E.	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: ? Sol: Insoluble Fl.P: ? IP: NA Sp.Gr: 2.0-2.25 Combustible Solid	VP: 0 mm (approx) MLT: ? UEL: ? LEL: ?	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Hafnium and compounds (as Hf) Hf 7440-58-6 (Metal) MG4600000 (Metal 2545 40 (Metal powder, dry) 1326 32 (Metal powder, wet)	Metal: Celtium, Elemental hafnium Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 0.5 mg/m³	Unknown	Metal: Highly lustrous, ductile, grayish solid.	MW: 178.5 BP: 8316°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 13.31 (Metal) Metal: Explosive in powder form (either dry or with <25% water). Finely divided powder can be ignited by static electricity or EVEN SPONTANEOUSLY.	VP: 0 mm (approx) MLT: 4041°F UEL: NA LEL: NA	Strong oxidizers, chlorine	Filter; Acid; PES; II(5) [#S194]
Heptachlor $C_{10}H_5Cl_7$ 76-44-8 PC0700000 2761 55	1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene	NIOSH Ca See Appendix A 0.5 mg/m³ [skin] OSHA 0.5 mg/m³ [skin]	Ca [700 mg/m³]	White to light tan crystals with a camphor-like odor. [insecticide]	MW: 373.4 BP: 293°F (Decomposes) Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 1.66 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(77°F): 0.0003 mm MLT: 203°F UEL: NA LEL: NA	Iron, rust	Chrom-102; Toluene; GC/ECD; II(5) [#S287]
n-Heptane $CH_3[CH_2]_5CH_3$ 142-82-5 MI7700000 1206 27	Heptane, normal-Heptane 1 ppm = 4.17 mg/m³	NIOSH 85 ppm (350 mg/m³) C 440 ppm (1800 mg/m³) [15-min] OSHA 400 ppm (1600 mg/m³) ST 500 ppm (2000 mg/m³)	5000 ppm	Colorless liquid with a gasoline-like odor.	MW: 100.2 BP: 209°F Sol(60°F): 0.005% Fl.P: 25°F IP: 9.90 eV Sp.Gr: 0.68 Class IB Flammable Liquid	VP(72°F): 40 mm FRZ: -131°F UEL: 6.7% LEL: 1.05%	Strong oxidizers	Char; CS_2; GC/FID; III [#1500; Hydrocarbons]

000127

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 12.5 mg/m³: D 25 mg/m³: DXSQ/SA/SCBA 62.5 mg/m³: PAPRD/SA:CF 125 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 1250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Cough, dysp, black sputum, pulm func impairment, lung fib	Eye: Irr immed Breath: Fresh air		Resp sys, CVS
Clothing: Any poss Goggles: Any poss Wash: Prompt contam/daily Change: After work if any poss contam Remove: Prompt non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 2.5 mg/m³: DM 5 mg/m³: DMXSQ/SA/SCBA 12.5 mg/m³: PAPRDM*/SA:CF* 25 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF/SAT:CF* 250 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: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, muc memb
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	In animals: tremors, convuls; liver damage; [carc]	Eye: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed		In animals: CNS; liver
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 850 ppm: CCROV/SA/SCBA 1000 ppm: PAPROV/CCRFOV 2125 ppm: SA:CF 4250 ppm: GMFOV/SCBAF/SAF/SAT:CF 5000 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, gidd, stupor; no appetite, nau; derm; chemical pneu; unconsciousness	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, resp sys, PNS

n-Heptane

7353

000128

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Hexachloroethane Cl_3CCCl_3 67-72-1 KI4025000 9037 53	Carbon hexachloride, Perchloroethane	NIOSH Ca See Appendix A 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% Fl.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; III [#1003, Halogenated Hydrocarbons]
Hexachloronaphthalene $C_{10}H_2Cl_6$ 1335-87-1 QJ7350000	Halowax® 1014	NIOSH/OSHA 0.2 mg/m³ [skin]	2 mg/m³	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]
n-Hexane $CH_3[CH_2]_4CH_3$ 110-54-3 MN9275000 1208 27	Hexane, Hexyl hydride, Normal-hexane 1 ppm = 3.58 mg/m³	NIOSH/OSHA 50 ppm (180 mg/m³)	5000 ppm	Colorless liquid with a gasoline-like odor.	MW: 86.2 BP: 156°F Sol: 0.002% Fl.P: -7°F IP: 10.18 eV Sp.Gr: 0.66 Class IB Flammable Liquid	VP(77°F): 150 mm FRZ: -219°F UEL: 7.5% LEL: 1.1%	Strong oxidizers	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
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 = 4.17 mg/m³	NIOSH 1 ppm (4 mg/m³) OSHA 5 ppm (20 mg/m³)	5000 ppm	Colorless liquid with an acetone-like odor.	MW: 100.2 BP: 262°F Sol: 2% Fl.P: 77°F IP: 9.34 eV Sp.Gr: 0.81 Class IC Flammable Liquid	VP(77°F): 4 mm FRZ: -71°F UEL: 8% LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; III [#1300, Ketones I]

000129

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: N.R. Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes
Clothing: Any poss molt/Repeat liq sol/Reason prob fumes Goggles: Any poss molt/Reason prob liq Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Immed wet molt/Prompt non-imperv contam liq	NIOSH/OSHA 2 mg/m³: SA*/SCBA* ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Acne-form derm, nau, conf, jaun, coma	Eye: Skin: Irr immed Breath: Soap wash prompt Swallow: Resp support Medical attention immed	Liver, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 500 ppm: SA*/SCBA* 1250 ppm: SA:CF* 2500 ppm: SAT:CF*/SCBAF/SAF 5000 ppm: SAF:PD,PP ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head; nau, head; numb extremities, musc weak; irrit eyes, nose; derm; chemical pneu; gidd	Eye: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed	Skin, eyes, resp sys
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH 10 ppm: SA/SCBA 25 ppm: SA:CF 50 ppm: SCBAF/SAF/SAT:CF 2000 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; drow	Eye: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed	CNS, skin, resp sys

2-Hexanone

7353

000130

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Hexone $CH_3COCH_2CH(CH_3)_2$ 108-10-1 SA9275000 1245 26	Isobutyl methyl ketone, Methyl isobutyl ketone, 4-Methyl 2-pentanone, MIBK 1 ppm = 4.17 mg/m³	NIOSH/OSHA 50 ppm (205 mg/m³) ST 75 ppm (300 mg/m³)	3000 ppm	Colorless liquid with a pleasant odor.	MW: 100.2 BP: 242°F Sol: 2% Fl.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; III [#1300, Ketones I]
sec-Hexyl acetate $C_8H_{16}O_2$ 108-84-9 SA7525000 1233 26	1,3-Dimethylbutyl acetate; Methylisoamyl acetate [$CH_3COOCH(CH_3)$-$CH_2CH(CH_3)_2$] 1 ppm = 5.99 mg/m³	NIOSH/OSHA 50 ppm (300 mg/m³)	4000 ppm	Colorless liquid with a mild, pleasant, fruity odor.	MW: 144.2 BP: 297°F Sol: 0.08% Fl.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; III [#1450, Esters I]
Hydrazine N_2H_4 302-01-2 MU7175000 2030 59 (<64% soln) 2029 28 (>64% soln)	Diamine, Hydrazine (anhydrous), Hydrazine base 1 ppm = 1.33 mg/m³	NIOSH Ca See Appendix A C 0.03 ppm (0.04 mg/m³) [2-hr] OSHA 0.1 ppm (0.1 mg/m³) [skin]	Ca [80 ppm] ACGIH A2	Colorless liquid with an ammonia-like odor. [Note: A solid below 36°F.]	MW: 32.1 BP: 236°F Sol: Miscible Fl.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, and cloth.]	Bub; Reagent; Vis; III [#3503]
Hydrogen bromide HBr 10035-10-6 MW3850000 1048 15	Anhydrous hydrogen bromide; Aqueous hydrogen bromide (i.e., Hydrobromic acid) 1 ppm = 3.36 mg/m³	NIOSH/OSHA C 3 ppm (10 mg/m³)	50 ppm	Colorless gas with a sharp, irritating odor. [Note: Often used in an aqueous solution.]	MW: 80.9 BP: -88°F Sol: 49% Fl.P: NA IP: 11.62 eV Nonflammable Gas	VP: >1 atm FRZ: -124°F UEL: NA LEL: NA	Strong oxidizers, strong caustics, metals, moisture [Note: Hydrobromic acid is highly corrosive to metals.]	Si gel; $NaHCO_3$/Na_2CO_3; IC; III [#7903, Inorganic Acids]

000131

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF/SAT:CF* 3000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narco, coma; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 4000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; in animals: irrit eyes, nose, throat; narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		CNS, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; temporary blindness; dizz, nau; derm; burns skin, eyes; [carc]; in animals: bron, pulm edema; liver, kidney damage; convuls	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		CNS, resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 50 ppm: SA:CF[£]/PAPRAG[£]/GMFAG/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; skin, eye burns	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, skin

Hydrogen bromide

7353

000132

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Hydrogen chloride HCl 7647-01-0 MW4025000 1050 15 (anhydrous)	Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) 1 ppm = 1.52 mg/m³	NIOSH/OSHA C 5 ppm (7 mg/m³)	100 ppm	Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Often used in an aqueous solution.]	MW: 36.5 BP: -121°F Sol(86°F): 67% Fl.P: NA IP: 12.74 eV Nonflammable Gas	VP: >1 atm FRZ: -174°F UEL: NA LEL: NA	Metals, hydroxides, amines, alkalis [Note: Hydrochloric acid is highly corrosive to most metals.]	Si gel; $NaHCO_3$/Na_2CO_3; IC; III [7903, Inorganic Acids]
Hydrogen cyanide HCN 74-90-8 MW6825000 1051 13 1613 57 (5% acid)	Formonitrile, Hydrocyanic acid, Prussic acid 1 ppm = 1.12 mg/m³	NIOSH/OSHA ST 4.7 ppm (5 mg/m³) [skin]	50 ppm	Colorless or pale blue liquid or gas (above 78°F) with a bitter, almond-like odor.	MW: 27.0 BP: 78°F Sol: Miscible Fl.P: 0°F IP: 13.60 eV Sp.Gr: 0.69 Class IA Flammable Liquid	VP: 630 mm FRZ: 8°F 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.]	Filter/Bub; KOH; ISE; III [7904, Cyanides] [Note: Also Soda lime; Water; Vis; 6010.]
Hydrogen fluoride (as F) HF 7664-39-3 MW7875000 1052 15 (anhydrous)	Anhydrous hydrogen fluoride; Aqueous hydrogen fluoride (i.e., Hydrofluoric acid); HF-A 1 ppm = 0.83 mg/m³	NIOSH 3 ppm (2.5 mg/m³) C 6 ppm 5 mg/m³ [15-min] OSHA 3 ppm ST 6 ppm	30 ppm	Colorless gas or fuming liquid (below 67°F) with a strong, irritating odor. [Note: Shipped in cylinders.]	MW: 20.0 BP: 67°F Sol: Miscible Fl.P: NA IP: 15.98 eV Sp.Gr: 1.00 (Liquid at 67°F) Nonflammable Gas	VP: >1 atm 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; III [7903, Inorganic Acids]
Hydrogen peroxide H_2O_2 7722-84-1 MX0900000 2984 60 (8-20% soln) 2014 45 (20-52% soln) 2015 47 (>52% soln)	High-strength hydrogen peroxide, Hydrogen dioxide, Hydrogen peroxide (aqueous), Hydroperoxide, Peroxide 1 ppm = 1.41 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 Fl.P: NA IP: 10.54 eV Sp.Gr: 1.39 Noncombustible Liquid, but a powerful oxidizer.	VP(86°F): 5 mm FRZ: 12°F UEL: NA LEL: NA	Oxidizable materials, iron, copper, brass, bronze, chromium, zinc, lead, manganese, silver [Note: Contact with combustible material may result in SPONTANEOUS combustion.]	None available

000133

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss pH <3/Repeat pH >3 Goggles: Any poss Wash: Immed contam pH <3/ Prompt wet pH >3 Change: N.R. Remove: Immed non-imperv contam pH <3/Prompt non-imperv wet Provide: pH <3: Eyewash, quick drench	NIOSH/OSHA 50 ppm: SA*/SCBA*/CCRS* 100 ppm: SA:CF*/SCBAF/SAF/GMFS/ CCRFS/PAPRS* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	Inh Ing Con	Inflamm nose, throat, lar; cough, burns throat, choking; burns eyes, skin; derm; in animals: lar spasm; pulm edema	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH/OSHA 47 ppm: SA/SCBA 50 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Asphy and death at high levels; weak, head, conf; nau, vomit; incr rate and depth of respiration or respiration slow and gasping	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	CNS; CVS, liver, kidneys
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 30 ppm: SA*/SCBA*/PAPRS*/CCRS*/ GMFS §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; pulm edema; skin, eye burns; nasal congestion; bron	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Prompt contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: SA*/SCBA* 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; corneal ulcer; erythema, vesicles on skin; bleaching hair	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys

7353

127

000134

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Hydrogen selenide (as Se) H_2Se 7783-07-5 MX1050000 2202 18	Selenium dihydride, Selenium hydride 1 ppm = 3.37 mg/m³	NIOSH/OSHA 0.05 ppm (0.2 mg/m³)	2 ppm	Colorless gas with an odor resembling decayed horse radish.	MW: 81.0 BP: -42°F Sol(73°F): 0.9% Fl.P: NA (Gas) IP: 9.88 eV Flammable Gas	VP: >1 atm FRZ: -87°F UEL: ? LEL: ?	Strong oxidizers, acids, water, halogenated hydrocarbons	None available
Hydrogen sulfide H_2S 7783-06-4 MX1225000 1053 13	Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen 1 ppm = 1.42 mg/m³	NIOSH C 10 ppm (15 mg/m³) [10-min] OSHA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³)	300 ppm	Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H_2S. Shipped as a liquefied compressed gas.]	MW: 34.1 BP: -77°F Sol: 0.4% Fl.P: NA (Gas) IP: 10.46 eV Flammable Gas	VP: >1 atm FRZ: -122°F UEL: 44.0% LEL: 4.0%	Strong oxidizers, strong nitric acid, metals	Dry tube/ Mol-sieve; Thermal desorp; GC/FID; II(6) [P&CAM #296]
Hydroquinone $C_6H_4(OH)_2$ 123-31-9 MX3500000 2662 53	1,4-Benzenediol; Dihydroxybenzene; 1,4-Dihydroxybenzene; Quinol	NIOSH C 2 mg/m³ [15-min] OSHA 2 mg/m³	Unknown	Light tan, light gray, or colorless crystals.	MW: 110.1 BP: 545°F Sol: 7% Fl.P: 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; III [#5004]
Iodine I_2 7553-56-2 NN1575000	Iodine crystals, Molecular iodine	NIOSH/OSHA C 0.1 ppm (1 mg/m³)	10 ppm	Violet solid with a sharp, characteristic odor.	MW: 253.8 BP: 365°F Sol: 0.01% Fl.P: NA IP: 9.31 eV Sp.Gr: 4.93 Noncombustible	VP(77°F): 0.3 mm MLT: 236°F UEL: NA LEL: NA Solid	Ammonia, acetylene, acetaldehyde, powdered aluminum, active metals, liquid chlorine	Char*; Na_2CO_3; IC; III [#6005]

000135

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA:CF* 2 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[4]/SCBAE	Inh Con	Irrit eyes, nose, throat; nau, vomit, diarr; metallic taste, garlic breath; dizz, lass, ftg; in animals: pneuitis, liver damage	Breath: Resp support	Resp sys, eyes
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 100 ppm: SA*/SCBA* 250 ppm: SA:CF* 300 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Apnea, coma, convuls; irrit eyes: conj, pain, lac, photo, corneal vesic; irrit resp sys; dizz; head; ftg, irrity; insom; GI dist	Eye: Irr immed Skin: Water flush immed Breath: Resp support	Resp sys, eyes
Clothing: Repeat Goggles: Any poss >7%/Reason prob <7% Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: >7%: Eyewash	NIOSH/OSHA 50 mg/m³: PAPRD[ε] 100 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE[ε]/SAT:CF[ε] 200 mg/m³: SAF:PD,PP §: 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	Eye: Irr immed (15 min) Skin: Water flush Breath: Fresh air Swallow: Medical attention immed	Eyes, resp sys, skin, CNS
Clothing: Any poss >7%/Repeat <7% Goggles: Any poss >7%/Reason prob <7% Wash: Immed contam >7%/Prompt contam <7% Change: N.R. Remove: Immed non-imperv contam >7%/Prompt non-imperv wet <7% Provide: 7%: Eyewash, quick drench	NIOSH/OSHA 1 ppm: SA*/SCBA* 2.5 ppm: SA:CF* 5 ppm: SCBAF/SAF 10 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAGHiE/SCBAE	Inh Ing Con	Irrit eyes, nose; lac; head; tight chest; skin burns, rash; cutaneous hypersensitivity	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin, CNS, CVS
Iodine					

7353

129

000136

Chemical name, structure/formula, CAS and RTECS Nos., and 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 oxide dust and fume (as Fe) Fe_2O_3 1309-37-1 NO7525000 1376 37	Ferric oxide	NIOSH 5 mg/m³ OSHA 10 mg/m³	N.E.	Reddish-brown solid. [Note: Exposure to fume may occur during the arc-welding of iron.]	MW: 159.7 BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2664°F UEL: NA LEL: NA	Calcium hypochlorite	Filter; none; XRF; III [#7200, Welding & Brazing Fume]
Isoamyl acetate CH_3COOCH_2-$CH_2CH(CH_3)_2$ 123-92-2 NS9800000 1 ppm = 5.41 mg/m³	Banana oil, Isopentyl acetate, 3-Methyl-1-butanol acetate, 3-Methylbutyl ester of acetic acid, 3-Methylbutyl ethanoate	NIOSH/OSHA 100 ppm (525 mg/m³)	3000 ppm	Colorless liquid with a banana-like odor.	MW: 130.2 BP: 288°F Sol: 0.3% Fl.P: 77°F IP: ? Sp.Gr: 0.87 Class IC Flammable Liquid	VP: 4 mm FRZ: -109°F UEL: 7.5% LEL(212°F): 1.0%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
Isoamyl alcohol (primary and secondary) 1: $(CH_3)_2CHCH_2CH_2OH$ 2: $(CH_3)_2CHCH(OH)CH_3$ 1: 123-51-3 2: 528-75-4 1: EL5425000 1105 26	1(primary): Fermentation amyl alcohol, Fusel oil, Isobutyl carbinol, Isopentyl alcohol, 3-Methyl-1-butanol 2(secondary): 3-Methyl-2-butanol 1 ppm = 3.67 mg/m³	NIOSH/OSHA 100 ppm (360 mg/m³) ST 125 ppm (450 mg/m³)	10,000 ppm	Colorless liquids with a disagreeable odor.	MW: 88.2 BP: 270/234°F Sol(57°F): 2%/? Fl.P: 109/95°F(oc) IP: ?/? Sp.Gr: 0.81 (at 57°F)/0.82 primary: Class II Combustible Liquid secondary: Class IC Flammable Liquid	VP: 28/1 mm FRZ: -179°F/? UEL(212°F): 9.0%/? LEL: 1.2%/?	Strong oxidizers	Char; 2-Propanol/CS_2; GC/FID; III [#1402, Alcohols III]
Isobutyl acetate $CH_3COOCH_2CH(CH_3)_2$ 110-19-0 AI4025000 1213 26	Isobutyl ester of acetic acid, 2-Methylpropyl acetate, 2-Methylpropyl ester of acetic acid, beta-Methylpropyl ethanoate 1 ppm = 4.83 mg/m³	NIOSH/OSHA 150 ppm (700 mg/m³)	7500 ppm	Colorless liquid with a fruity, floral odor.	MW: 116.2 BP: 243°F Sol(77°F): 0.6% Fl.P: 84°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; CS_2; GC/FID; III [#1450, Esters I]

000137

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH 50 mg/m³: DMFu/SA/SCBA 125 mg/m³: PAPRDMFu/SA:CF 250 mg/m³: HIEF/PAPRTHIE/SCBAF/SAF/SAT:CF 5000 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	Breath:	Resp support	Resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCROV/PAPROV/SA/SCBA 2500 ppm: SA:CF 3000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 1000 ppm: CCRFOV/PAPROV[c] 2500 ppm: SA:CF[c] 5000 ppm: SCBAF/SAF/GMFOV 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; head, dizz; dysp, nau, vomit, diarr; skin cracking	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[c]/CCRFOV 3750 ppm: SA:CF[c] 7500 ppm: SCBAF/SAF/GMFOV §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; drow; irrit eyes, upper resp sys, skin; anes	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Skin, eyes, resp sys

7353

131

000138

Isobutyl acetate

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Isobutyl alcohol $(CH_3)_2CHCH_2OH$ 78-83-1 NP9625000	IBA, Isobutanol, Isopropylcarbinol, 2-Methyl-1-propanol	NIOSH/OSHA 50 ppm (150 mg/m³)	8000 ppm	Colorless, oily liquid with a sweet, musty odor.	MW: 74.1 BP: 227°F Sol: 10% Fl.P: 82°F IP: 10.12 eV	VP: 9 mm FRZ: -162°F UEL(202°F): 10.6% LEL(123°F): 1.7%	Strong oxidizers	Char; 2-Propanol/CS_2; GC/FID; III [#1401, Alcohols II].
1212 26	1 ppm = 3.08 mg/m³				Sp.Gr: 0.80 Class IC Flammable Liquid			
Isophorone $C_9H_{14}O$ 78-59-1 GW7700000	Isoacetophorone; 3,5,5-Trimethyl-2-cyclohexenone; 3,5,5-Trimethyl-2-cyclohexen-1-one	NIOSH/OSHA 4 ppm (23 mg/m³)	800 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	VP(77°F): 0.4 mm FRZ: 17°F UEL: 3.8% LEL: 0.8%	Strong oxidizers	Char(pet); CS_2; GC/FID; III [#2508]
	1 ppm = 5.74 mg/m³				Sp.Gr: 0.92 Class IIIA Combustible Liquid			
Isopropyl acetate $CH_3COOCH(CH_3)_2$ 108-21-4 AI4930000	Isopropyl ester of acetic acid, 1-Methylethyl ester of acetic acid, 2-Propyl acetate	NIOSH See Appendix D OSHA 250 ppm (950 mg/m³) ST 310 ppm (1185 mg/m³)	16,000 ppm	Colorless liquid with a fruity odor.	MW: 102.2 BP: 194°F Sol: 3% Fl.P: 36°F IP: 9.95 eV	VP: 42 mm FRZ: -92°F UEL: 8% LEL(100°F): 1.8%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; II(2) [#S50]
1220 26	1 ppm = 4.25 mg/m³				Sp.Gr: 0.87 Class IB Flammable Liquid			
Isopropyl alcohol $(CH_3)_2CHOH$ 67-63-0 NT8050000	Dimethyl carbinol, IPA, Isopropanol, 2-Propanol, sec-Propyl alcohol, Rubbing alcohol	NIOSH/OSHA 400 ppm (980 mg/m³) ST 500 ppm (1225 mg/m³)	12,000 ppm	Colorless liquid with the odor of rubbing alcohol.	MW: 60.1 BP: 181°F Sol: Miscible Fl.P: 53°F IP: 10.10 eV	VP: 33 mm FRZ: -127°F UEL(200°F): 12.7% LEL: 2.0%	Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates	Char; 2-Butanol/CS_2; GC/FID; III [#1400, Alcohols I]
1219 26	1 ppm = 2.50 mg/m³				Sp.Gr: 0.79 Class IB Flammable Liquid			

000139

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: immed wet (flamm)	NIOSH/OSHA 500 ppm: SA*/SCBA*/CCROV* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, throat; head, drow; skin irrit, cracking	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Any poss Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet Provide: Eyewash	NIOSH/OSHA 40 ppm: SA*/SCBA*/CCROV* 100 ppm: SA:CF*/PAPROV* 200 ppm: GMFOV/SCBAF/SAF/PAPRTOV*/SAT:CF* 800 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	OSHA 6250 ppm: SA:CF[t] 12,500 ppm: SCBAF/SAF 16,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, skin; derm; narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[t]/CCRFOV 10,000 ppm: SA:CF[t] 12,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Mild irrit eyes, nose, throat; drow, dizz, head; dry cracking skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush Resp support Medical attention Immed	Eyes, skin, resp sys

Isopropyl alcohol

7353

000140

7353

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Isopropylamine $(CH_3)_2CHNH_2$ 75-31-0 NT8400000 1221 68	2-Aminopropane, Monoisopropylamine, 2-Propylamine, sec-Propylamine 1 ppm = 2.46 mg/m³	NIOSH See Appendix D OSHA 5 ppm (12 mg/m³) ST 10 ppm (24 mg/m³)	4000 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	Bub; NaOH; GC/FID; II(3) [#S147]
Isopropyl ether $(CH_3)_2CHOCH(CH_3)_2$ 108-20-3 TZ5425000 1159 26	Diisopropyl ether, Diisopropyl oxide, 2-Isopropoxy propane 1 ppm = 4.25 mg/m³	NIOSH/OSHA 500 ppm (2100 mg/m³) ACGIH 250 ppm (1050 mg/m³) ST 310 ppm (1320 mg/m³)	10,000 ppm	Colorless liquid with a sharp, sweet, ether-like odor.	MW: 102.2 BP: 154°F Sol: 0.2% Fl.P: -18°F IP: 9.20 eV Sp.Gr: 0.73 Class IB Flammable Liquid	VP: 119 mm FRZ: -76°F UEL: 7.9% LEL: 1.4%	Strong oxidizers, acids [Note: Unstable peroxides may form upon long contact of isopropyl ether with air.]	Char; CS_2; GC/FID; II(3) [#S368]
Isopropyl glycidyl ether $C_6H_{12}O_2$ 4016-14-2 TZ3500000	1,2-Epoxy-3-isopropoxy-propane; IGE; Isopropoxymethyl oxirane 1 ppm = 4.83 mg/m³	NIOSH C 50 ppm (240 mg/m³) [15-min] OSHA 50 ppm (240 mg/m³) ST 75 ppm (360 mg/m³)	1000 ppm	Colorless liquid.	MW: 116.2 BP: 279°F Sol: 19% Fl.P: 92°F IP: ? Sp.Gr: 0.92 Class IC Flammable Liquid	VP(77°F): 9 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics	Char; CS_2; GC/FID; II(2) [#S77]
Ketene $CH_2=CO$ 463-51-4 OA7700000	Carbomethene, Ethenone, Keto-ethylene 1 ppm = 1.75 mg/m³	NIOSH/OSHA 0.5 ppm (0.9 mg/m³) ST 1.5 ppm (3 mg/m³)	Unknown	Colorless gas with a penetrating odor.	MW: 42.0 BP: -69°F Sol: Decomposes Fl.P: NA (Gas) IP: 9.61 eV Flammable Gas	VP: >1 atm FRZ: -238°F UEL: ? LEL: ?	Water (decomposes), alcohols, ammonia [Note: Readily polymerizes.]	Bub; $FeCl_3$; Vis; II(2) [#S92]

000141

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Reason prob	OSHA	Inh	Irrit eyes, nose, throat,	Eye:	Irr immed	Resp sys, skin, eyes
Goggles:	Any poss	125 ppm: SA:CF[t]/PAPRS[t]	Abs	skin; pulm edema; vis	Skin:	Water flush immed	
Wash:	Immed wet	250 ppm: CCRFS/GMFS/SCBAF/SAF/PAPRTS[t]	Inh	dist; skin, eye burns;	Breath:	Resp support	
Change:	N.R.	4000 ppm: SAF:PD,PP	Con	derm	Swallow:	Medical attention immed	
Remove:	Immed wet (flamm)	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
Provide:	Eyewash, quick drench	Escape: GMFS/SCBAE					

7353

Clothing:	Repeat	ACGIH	Inh	Irrit eyes, nose; resp	Eye:	Irr immed	Resp sys, skin
Goggles:	Reason prob	1000 ppm: PAPROV*/CCROV*	Ing	discomfort; derm;	Skin:	Soap wash prompt	
Wash:	Prompt wet	2500 ppm: SA*/SCBA*	Con	in animals: drow, dizz,	Breath:	Resp support	
Change:	N.R.	6250 ppm: SA:CF*		unconsciousness, narco	Swallow:	Medical attention immed	
Remove:	Immed wet	10,000 ppm: SCBAF/SAF/GMFOV					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					

135

Clothing:	Repeat	NIOSH/OSHA	Inh	Irrit eyes, upper resp	Eye:	Irr immed	Eyes, skin, resp sys
Goggles:	Reason prob	1000 ppm: SA:CF[t]	Ing	sys, skin; skin sens	Skin:	Soap wash immed	
Wash:	Prompt contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con		Breath:	Resp support	
Change:	N.R.	Escape: GMFOV/SCBAE			Swallow:	Medical attention immed	
Remove:	Immed wet (flamm)						

Clothing:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, nose, throat,	Breath:	Resp support	Resp sys, eyes, skin
Goggles:	N.R.	5 ppm: SA*/SCBA*	Con	lungs; pulm edema			
Wash:	N.R.	12.5 ppm: SA:CF[t]					
Change:	N.R.	25 ppm: SCBAF/SAF					
Remove:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					

000142

Ketene

7353

136

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Lead (as Pb) Pb 7439-92-1 (Metal) OF7525000 (Metal) 2291 53(soluble cmpds)	Metal: Lead metal, Plumbum [Note: OSHA considers "Lead" to mean metallic Pb, all inorganic Pb cmpds (Pb oxides and Pb salts), and a class of organic Pb cmpds called soaps. All other organic Pb cmpds are excluded from this definition.]	NIOSH 0.100 mg/m³ [Air concentration to be maintained so that worker blood lead remains <0.060 mg/100 g of whole blood.] OSHA [1910.1025] 0.050 mg/m³	700 mg/m³	Metal: A heavy, ductile, soft gray solid.	MW: 207.2 BP: 3164°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 11.34 (Metal) Metal: 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; AA; III [#7082]
Lindane $C_6H_6Cl_6$ 58-89-9 GV4900000 2761 55	BHC; gamma-Hexachlorocyclohexane; HCH; 1,2,3,4,5,6-Hexachlorocyclohexane	NIOSH/OSHA 0.5 mg/m³ [skin]	1000 mg/m³	White to yellow, crystalline powder with a slight musty odor. [pesticide]	MW: 290.8 BP: 614°F Sol: 0.001% Fl.P: NA IP: ? Sp.Gr: 1.85 Noncombustible Solid, but may be dissolved in flammable liquids.	VP: 0.00001 mm MLT: 235°F UEL: NA LEL: NA	Corrosive to metals	Filter/Bub; Isooctane; GC/EConD; III [#5502]
Lithium hydride LiH 7580-67-8 OJ6300000 1414 40 2805 40 (fused solid)	Lithium monohydride	NIOSH/OSHA 0.025 mg/m³	55 mg/m³	Odorless, off-white to gray translucent, crystalline mass or white powder. Sp.Gr: 0.78 Combustible Solid, but can form airborne dust clouds which may explode on contact with flame, heat, or oxidizers.	MW: 7.95 BP: Decomposes Sol: Reacts Fl.P: ? IP: NA	VP: 0 mm (approx) MLT: 1256°F UEL: ? LEL: ?	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 22	Bottled gas, Compressed petroleum gas, Liquefied hydrocarbon gas, Liquefied petroleum gas, LPG	NIOSH/OSHA 1000 ppm (1800 mg/m³)	19,000 ppm [LEL]	Colorless, noncorrosive, odorless gas when pure. [Note: A foul-smelling odorant is usually added. A fuel mixture of propane, propylene, butanes & butylenes. Shipped as a liquefied compressed gas.] Flammable Gas	MW: 42 to 58 BP: >-44°F Sol: ? Fl.P: NA (Gas) IP: 10.95 eV	VP: >1 atm FRZ: ? UEL: 9.5% (Propane) 8.4% (Butane) LEL: 2.1% (Propane) 1.6% (Butane)	Strong oxidizers, chlorine dioxide	Combustible gas meter; none; none; II(2) [#S93]

000143

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Daily N.R. Prompt non-imperv contam	OSHA 0.5 mg/m³: SA/HiE/SCBA 1.25 mg/m³: PAPRHiE/SA:CF 2.5 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 50 mg/m³: SA:PD,PP 100 mg/m³: 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; nephropathy; irrit eyes; hypotension	Eye: Skin: Breath: Swallow:	Irr immed Soap flush prompt Resp support Medical attention immed	GI tract, CNS, kidneys, blood, gingival tissue
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob N.R. Immed contam After work if reason prob contam Immed non-imperv contam liq Quick drench	NIOSH/OSHA 5 mg/m³: CCROVDMFu/SA/SCBA 12.5 mg/m³: PAPROVDMFu*/SA:CF* 25 mg/m³: CCRFOVHiE/SCBAF/SAF/GMFOVHiE/PAPRTOVHiE* 1000 mg/m³: SAF:PD,PP §: SCBAF: PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head; nau; clonic convuls; resp difficulty; cyan; aplastic anemia; skin irrit; musc spasm; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, CNS, blood, liver, kidneys, skin
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss sol/Repeat air >0.1 mg/m³ Any poss Brush/immed contam After work if any poss contam Immed contam Eyewash/>0.5 mg/m³: quick drench	NIOSH/OSHA 0.25 mg/m³: SA/SCBA/HiE 0.625 mg/m³: SA:CF*/PAPRHiE* 1.25 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE* 50 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Burns eyes, skin; burns mouth, esophagus (if ingested); nau; musc twitches; mental conf; blurred vision	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, skin, eyes
Clothing: Goggles: Wash: Change: Remove:	Prevent skin freezing Reason prob N.R. N.R. Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 19,000 ppm: SA:CF/SCBAF/SAF/SAT:CF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	Li-head, drow	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	Resp sys, CNS

7353

000144

137

L.P.G.

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: 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)
Magnesium oxide fume MgO 1309-48-4 OM3850000	Magnesia fume	NIOSH See Appendix D OSHA 10 mg/m³	N.E.	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 pentachloride	Filter; Acid; ICP; III [#7300, Elements]
Malathion $C_{10}H_{19}O_6PS_2$ 121-75-5 WM8400000	S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dimethyl-phosphorodithioate; Diethyl (dimethoxyphosphino-thioylthio) succinate	NIOSH/OSHA 10 mg/m³ [skin]	5000 mg/m³	Deep brown to yellow liquid with a garlic-like odor. [Note: A solid below 37°F.] [insecticide]	MW: 330.4 BP: 140°F (Decomposes) Sol: 0.02% Fl.P(oc): >325°F IP: ? Sp.Gr: 1.21 Class IIIB Combustible Liquid, but may be difficult to ignite.	VP: 0.00004 mm FRZ: 37°F UEL: ? LEL: ?	Strong oxidizers, magnesium, alkaline pesticides [Note: Corrosive to metals.]	Filter; Isooctane; GC/FPD; III [#5012]
2783 55								
Maleic anhydride $C_4H_2O_3$ 108-31-6 ON3675000	cis-Butenedioic anhydride; 2,5-Furanedione; Maleic acid anhydride; Toxilic anhydride	NIOSH/OSHA 1 mg/m³ (0.25 ppm)	Unknown	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 (hydrolyzes) to form maleic acid.]	Bub; none; HPLC/UVD; II(5) [P&CAM #302]
2215 60	1 ppm = 4.08 mg/m³							
Manganese compounds (as Mn) Mn 7439-96-5 (Metal) OO9275000 (Metal)	Metal: Colloidal manganese, Manganese-55 Synonyms of other compounds vary depending upon the specific compound.	NIOSH 1 mg/m³ ST 3 mg/m³ OSHA C 5 mg/m³	N.E.	Metal: A lustrous brittle, silvery solid.	MW: 54.9 BP: 3564°F Sol: Insoluble Fl.P: ? IP: NA Sp.Gr: 7.20 Combustible Solid	VP: 0 mm (approx) MLT: 2271°F UEL: ? LEL: ?	Oxidizers [Note: Will react with water or steam to produce hydrogen.]	Filter; Acid; ICP; III [#7300, Elements]

000145

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	OSHA 100 mg/m³: DMFu/SA/SCBA 250 mg/m³: SA:CF/PAPRDMFu 500 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE* 5000 mg/m³: SAF:PD,PP §: 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	Resp sys, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 100 mg/m³: SA/SCBA/CCROVDMFu 250 mg/m³: SA:CF*/PAPROVDMFu* 500 mg/m³: SCBAF/SAF/CCRFOVHiE/GMFOVHiE/PAPRTOVHiE*/SAT:CF* 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Miosis, aching eyes, blurred vision, lac; eye, skin irrit; salv; anor, nau, vomit, abdom cramps, diarr, gidd, conf, ataxia; rhin, head; tight chest, wheez, lar spasm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, liver, blood chol, CNS, CVS, GI tract
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 25 mg/m³: SA:CF£ 50 mg/m³: SCBAF/SAF 2000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Conj; photo, double vision; nasal, upper resp irrit; bronchial asthma; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, skin
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH 10 mg/m³: DMXSQ^/SA/SCBA 25 mg/m³: PAPRDM^/SA:CF 50 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 1000 mg/m³: SA:PD,PP 2000 mg/m³: SAF: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, tight chest, dysp, rales, flu-like fever; low-back pain; vomit; mal; fig	Breath: Swallow:	Resp support Medical attention immed	Resp sys, CNS, blood, kidneys
Manganese compounds (as Mn)						

7353

000146

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Mercury vapor Hg 7439-97-6 OV4550000 2809 60	Colloidal mercury, Metallic mercury, Quicksilver	NIOSH/OSHA 0.05 mg/m³ [skin]	28 mg/m³	Silver-white, heavy, odorless liquid.	MW: 200.6 BP: 674°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 13.6 Noncombustible Liquid	VP: 0.0012 mm FRZ: -38°F UEL: NA LEL: NA	Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper	Hydrar; Acid; AA cold; III [#6009]
Mercury (organo) alkyl compounds (as Hg)	Synonyms vary depending upon the specific (organo) alkyl compound.	NIOSH/OSHA 0.01 mg/m³ ST 0.03 mg/m³ [skin]	10 mg/m³	Appearance and odor vary depending upon the specific (organo) alkyl compound.	Properties vary depending upon the specific (organo) alkyl compound.		Strong oxidizers such as chlorine	None available
Mesityl oxide $(CH_3)_2C{=}CHCOCH_3$ 141-79-7 SB4200000 1229 26	Isobutenyl methyl ketone, Isopropylideneacetone, Methyl isobutenyl ketone, 4-Methyl-3-penten-2-one 1 ppm = 4.08 mg/m³	NIOSH 10 ppm (40 mg/m³) OSHA 15 ppm (60 mg/m³) ST 25 ppm (100 mg/m³)	5000 ppm	Oily, colorless to light-yellow liquid with a peppermint- or honey-like odor.	MW: 98.2 BP: 266°F Sol: 3% Fl.P: 87°F IP: 9.08 eV 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; III [#1301, Ketones II]
Methoxychlor $Cl_3CCH(C_6H_4OCH_3)_2$ 72-43-5 KJ3675000 2761 55	p,p'-Dimethoxydiphenyltrichloroethane; 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 10 mg/m³	Ca [N.E.]	Colorless to light yellow crystals with a slight, fruity odor. [insecticide]	MW: 345.7 BP: Decomposes Sol: Insoluble Fl.P: ? IP: ? Sp.Gr(77°F): 1.41 Combustible Solid, but difficult to burn.	VP: Low MLT: 171-192°F UEL: ? LEL: ?	Oxidizers	Filter; Isooctane; GC/ECD; II(4) [#S371]

000147

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 0.5 mg/m³: CCRS†/SA/SCBA 1.25 mg/m³: SA:CF/PAPRS†(canister) 2.5 mg/m³: SCBAF/SAF/SAT:CF/CCRFS†/GMFS†/PAPRTS(canister) 28 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Con	Cough, chest pain, dysp, bron pneuitis; tremor, insom; irrity, indecision; head, ftg, weak; stomatitis, salv; GI dist, anor, low-wgt; prot; irrit eyes, skin	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, resp sys, CNS, kidneys, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 0.1 mg/m³: SA/SCBA 0.25 mg/m³: SA:CF 0.5 mg/m³: SCBAF/SAF/SAT:CF 10 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Pares; ataxia, dysarthria; vision, hearing dist; spastic, jerky; dizz; salv; lac; nau, vomit, diarr, constip; skin burns; emotional dist	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, kidneys, eyes, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed,wet (flamm) Provide: Quick drench	NIOSH 250 ppm: SA:CF‡/PAPROV‡ 500 ppm: CCRFOV/GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; narco, coma; in animals: CNS effects	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing	None known in humans; in animals: fasc trembling, convuls; kidney, liver damage; [carc]	Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed		None known
Methoxychlor						

7353

141

000148

Chemical name, structure/formula, CAS and RTECS Nos., and 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 acetate CH_3COOCH_3 79-20-9 AI9100000 1231 26	Methyl ester of acetic acid, Methyl ethanoate 1 ppm = 3.08 mg/m³	NIOSH/OSHA 200 ppm (610 mg/m³) ST 250 ppm (760 mg/m³)	10,000 ppm	Colorless liquid with a fragrant, fruity odor.	MW: 74.1 BP: 135°F Sol: 30% 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; CS_2; GC/FID; II(2) [#S42]
Methyl acetylene $CH_3C{\equiv}CH$ 74-99-7 UK4250000 1060 17 (stabilized)	Allylene, Propine, Propyne, 1-Propyne 1 ppm = 1.67 mg/m³	NIOSH/OSHA 1000 ppm (1650 mg/m³)	15,000 ppm [LEL]	Colorless gas with a sweet odor. [Note: A fuel that is shipped as a liquefied compressed gas.]	MW: 40.1 BP: -10°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.36 eV Flammable Gas	VP: >1 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]
Methyl acetylene-propadiene mixture $CH_3C{\equiv}CH/CH_2{=}C{=}CH_2$ UK4920000 1060 17 (stabilized)	MAPP gas, Methyl acetylene-allene mixture, Methyl acetylene-propadiene mixture (stabilized), Propadiene-methyl acetylene, Propyne-allene mixture, Propyne-propadiene mixture 1 ppm = 1.67 mg/m³	NIOSH/OSHA 1000 ppm (1800 mg/m³) ST 1250 ppm (2250 mg/m³)	15,000 ppm [LEL]	Colorless gas with a strong, characteristic, foul odor. [Note: A fuel that is shipped as a liquefied compressed gas.]	MW: 40.1 BP: -36 to -4°F Sol: Insoluble Fl.P: NA (Gas) IP: ? Flammable Gas	VP: >1 atm FRZ: -213°F UEL: ? LEL: ?	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 27 (inhibited)	Methoxycarbonylethylene, Methyl ester of acrylic acid, Methyl propenoate 1 ppm = 3.58 mg/m³	NIOSH/OSHA 10 ppm (35 mg/m³) [skin]	1000 ppm	Colorless liquid with an acrid odor.	MW: 86.1 BP: 176°F Sol: 6% Fl.P: 25°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; II(2) [#S38]

000149

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCROV*/PAPROV* 2000 ppm: SA*/SCBA* 5000 ppm: SA:CF* 10,000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit nose, throat; head, drow; optic atrophy	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 15,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Hyperexcitability, tremors, *anes; irrit resp sys*	Breath: Resp support		CNS
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 15,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Frostbite; disorientation, excitement	Eye: Irr immed Skin: Water flush immed *Breath: Resp support*		CNS, skin, eyes
Clothing: Any poss Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed wet (flamm) Provide: Quick drench	NIOSH/OSHA 100 ppm: SA*/SCBA* 250 ppm: SA:CF* 500 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Con	Irrit eyes, upper resp sys, skin	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, eyes, skin
Methyl acrylate						

7353

143

000150

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Methylal $CH_3OCH_2OCH_3$ 109-87-5 PA8750000 1234 26	Dimethoxymethane, Formal, Formaldehyde dimethylacetal, Methoxymethyl methyl ether, Methylene dimethyl ether 1 ppm = 3.16 mg/m³	NIOSH/OSHA 1000 ppm (3100 mg/m³)	15,000 ppm [LEL]	Colorless liquid with a chloroform-like odor.	MW: 76.1 BP: 111°F Sol: 33% Fl.P(oc): -26°F IP: 10.00 eV Sp.Gr: 0.86 Class IB Flammable Liquid	VP: 330 mm FRZ: -157°F UEL: 13.8% LEL: 2.2%	Strong oxidizers, acids	Char; Hexane; GC/FID; III [#1611]
Methyl alcohol CH_3OH 67-56-1 PC1400000 1230 28	Carbinol, Columbian spirits, Methanol, Wood alcohol, Wood spirits 1 ppm = 1.33 mg/m³	NIOSH/OSHA 200 ppm (260 mg/m³) ST 250 ppm (325 mg/m³) [skin]	25,000 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: 92 mm FRZ: -144°F UEL: 36% LEL: 6.0%	Strong oxidizers	Si gel; Water; GC/FID; III [#2000, Methanol]
Methylamine CH_3NH_2 74-89-5 PF6300000 1061 19 (anhydrous) 1235 68 (aqueous soln)	Aminomethane, Anhydrous methylamine, Aqueous methylamine, Monomethylamine 1 ppm = 1.29 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) IP: 8.97 eV Sp.Gr: 0.70 (Liquid at 13°F) Flammable Gas	VP: >1 atm FRZ: -136°F UEL: 20.7% LEL: 4.9%	Mercury, strong oxidizers, nitromethane [Note: Corrosive to copper & zinc alloys, aluminum & galvanized surfaces.]	XAD-7; Reagent; HPLC/FLD; OSHA [#40]
Methyl (n-amyl) ketone $CH_3CO[CH_2]_4CH_3$ 110-43-0 MJ5075000 1110 26	Amyl methyl ketone, n-Amyl methyl ketone, 2-Heptanone 1 ppm = 4.75 mg/m³	NIOSH/OSHA 100 ppm (465 mg/m³) ACGIH 50 ppm (235 mg/m³)	4000 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; III [#1301, Ketones II]

000151

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 15,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Mild irrit eyes, upper resp; anes; irrit skin	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Skin, resp sys, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 2000 ppm: SA/SCBA 5000 ppm: SA:CF 10,000 ppm: SCBAF/SAF/SAT:CF 25,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Eye irrit, head, drow, ll-head, nau, vomit; vis dist, blindness	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS, GI tract
Clothing: Any poss liq Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH/OSHA 100 ppm: SCBAF/SAF/CCRFS/GMFS/PAPRS‡ §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, resp sys; cough; skin, muc memb burns; derm; conj	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed contam	ACGIH 500 ppm: CCROV*/SA*/SCBA* 1250 ppm: SA:CF*/PAPROV* 2500 ppm: CCRFOV/GMFOV/SCBAF/SAF/SAT:CF* 4000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, 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

Methyl (n-amyl) ketone

7353

000152

145

Chemical name, structure/formula, CAS and RTECS Nos., and 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 bromide CH_3Br 74-83-9 PA4900000 1062 55	Bromomethane, Monobromomethane 1 ppm = 3.95 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 5 ppm (20 mg/m³) [skin]	Ca [2000 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: ? IP: 10.54 eV Sp.Gr: 1.73 (Liquid at 32°F) Flammable Gas, but only in presence of a high energy ignition source.	VP: >1 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); CS_2; GC/FID; III [#2520]
Methyl Cellosolve® $CH_3OCH_2CH_2OH$ 109-86-4 KL5775000 1188 26	EGME, Ethylene glycol monomethyl ether, Glycol monomethyl ether, 2-Methoxyethanol 1 ppm = 3.16 mg/m³	NIOSH Reduce exposure to lowest feasible concentration. OSHA 25 ppm (80 mg/m³) [skin]	* [2000 ppm] *Not applicable because of the NIOSH REL.	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: 1.8% LEL: 14%	Strong oxidizers, caustics	Char; Methanol/ CH_2Cl_2; GC/FID; III [#1403, Alcohols IV]
Methyl Cellosolve® acetate $CH_3COOCH_2CH_2OCH_3$ 110-49-6 KL5950000 1189 26	EGMEA, Ethylene glycol monomethyl ether acetate, Glycol monomethyl ether acetate, 2-Methoxyethyl acetate 1 ppm = 4.91 mg/m³	NIOSH Reduce exposure to lowest feasible concentration. OSHA 25 ppm (120 mg/m³) [skin]	* [4000 ppm] *Not applicable because of the NIOSH REL.	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; II(2) [#S39]
Methyl chloride CH_3Cl 74-87-3 PA6300000 1063 18	Chloromethane, Monochloromethane 000153 1 ppm = 2.10 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 50 ppm (105 mg/m³) ST 100 ppm (210 mg/m³)	Ca [10,000 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 Flammable Gas	VP: >1 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; III [#1001]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; vis dist; vertl; nau, vomit; mal; hand tremor; convuls; dysp; irrit eyes; skin irrit, vesic; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CNS, resp sys, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, drow, weak; ataxia, tremor, som; anemic pallor, irrit eyes; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	CNS, blood, skin, eyes, kidneys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Kidney damage; brain damage; eye irrit; in animals: eye, nose, throat irrit; narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Kidneys, brain, CNS, PNS
Clothing: Prevent wet or freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	Dizz, nau, vomit; vis dist; stagger; slur speech; convuls, coma; liver, kidney damage; frostbite; [carc]	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	CNS, liver, kidneys, skin

Methyl chloride

7353

000154

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Methyl chloroform CH_3CCl_3 71-55-6 KJ2975000 2831 74	Chlorothene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized) 1 ppm = 5.55 mg/m³	NIOSH C 350 ppm (1900 mg/m³) [15-min] OSHA 350 ppm (1900 mg/m³) ST 450 ppm (2450 mg/m³)	1000 ppm	Colorless liquid with a mild, chloroform-like odor.	MW: 133.4 BP: 165°F Sol: 0.4% Fl.P: None IP: 11.00 eV Sp.Gr: 1.34 Noncombustible Liquid, however the vapor will burn.	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; III [#1003, Halogenated Hydrocarbons]
Methylcyclohexane $CH_3C_6H_{11}$ 108-87-2 GV6125000 2296 27	Cyclohexylmethane, Hexahydrotoluene 1 ppm = 4.08 mg/m³	NIOSH/OSHA 400 ppm (1600 mg/m³)	10,000 ppm	Colorless liquid with a faint, benzene-like odor.	MW: 98.2 BP: 214°F Sol: Insoluble Fl.P: 25°F IP: 9.85 eV Sp.Gr: 0.77 Class IB Flammable Liquid	VP(72°F): 43 mm FRZ: -196°F UEL: 6.7% LEL: 1.2%	Strong oxidizers	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
Methylcyclohexanol $CH_3C_6H_{10}OH$ 25639-42-3 GW0175000 2617 26	Hexahydrocresol, Hexahydromethylphenol 1 ppm = 4.75 mg/m³	NIOSH/OSHA 50 ppm (235 mg/m³)	10,000 ppm	Straw-colored liquid with a weak odor like coconut oil.	MW: 114.2 BP: 311-356°F Sol: 4% Fl.P: 154°F IP: ? 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; II(4) [#S374]
o-Methylcyclohexanone $CH_3C_6H_9O$ 583-60-8 GW1750000 2297 26	2-Methylcyclohexanone 1 ppm = 4.66 mg/m³	NIOSH/OSHA 50 ppm (230 mg/m³) ST 75 ppm (345 mg/m³ [skin]	2500 ppm	Colorless liquid with a weak peppermint-like odor.	MW: 112.2 BP: 325°F Sol: Insoluble Fl.P: 118°F IP: ? Sp.Gr: 0.93 Class II Combustible Liquid	VP: 1 mm (approx) FRZ: 7°F UEL: ? LEL: ?	Strong oxidizers	Porapak; Acetone; GC/FID; III [#2521]

000155

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 1000 ppm: SA*/SCBA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head, lass, CNS depres, poor equi; irrit eyes; derm; card arrhy	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, CNS, CVS, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 4000 ppm: SA/SCBA 10,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, drow; skin, nose, throat irrit	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 500 ppm: SA*/SCBA* 1250 ppm: SA:CF* 2500 ppm: SCBAF:SAF 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; irrit eyes, upper resp sys; in animals: narco; liver, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes; In animals: CNS, liver, kidneys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 500 ppm: SA*/SCBA* 1250 ppm: SA:CF* 2500 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals: narco; irrit eyes, muc memb; derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		In animals; resp sys, liver, kidneys, skin

o-Methylcyclohexanone

7353

000156

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Methylene bisphenyl isocyanate $CH_2(C_6H_4NCO)_2$ 101-68-8 NQ9350000 2489 53	4,4'-Diphenylmethane diisocyanate; MDI; Methylene bis(4-phenyl isocyanate; Methylene di-p-phenylene ester of isocyanic acid	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)	100 mg/m³	White to light-yellow, odorless flakes. [Note: A liquid above 99°F.]	MW: 250.3 BP: 342°F Sol: 0.2% Fl.P(oc): 396°F IP: ? Sp.Gr(122°F): 1.19 Combustible Solid	VP(104°F): 0.001 mm MLT: 99°F UEL: ? LEL: ?	Strong alkalis, acids, alcohol	Bub; Acetylate; HPLC/UVD; III [#5521]
Methylene chloride CH_2Cl_2 75-09-2 PA8050000 1593 74	Dichloromethane, Methylene dichloride 1 ppm = 3.53 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 500 ppm C 1000 ppm 2000 ppm (5-min max peak in any 2 hrs) ACGIH A2, 50 ppm (175 mg/m³)	Ca [5000 ppm]	Colorless liquid with a chloroform-like odor. [Note: A gas above 104°F.]	MW: 84.9 BP: 104°F Sol: 2% Fl.P: ? IP: 11.32 eV Sp.Gr: 1.33 Combustible Liquid	VP: 350 mm FRZ: -139°F UEL: 22% LEL: 14%	Strong oxidizers; caustics; chemically-active metals such as aluminum, magnesium powders, potassium & sodium; concentrated nitric acid	Char(2); CS_2; GC/FID; III [#1005]
Methyl formate $HCOOCH_3$ 107-31-3 LQ8925000 1243 26	Methyl ester of formic acid, Methyl methanoate 1 ppm = 2.50 mg/m³	NIOSH/OSHA 100 ppm (250 mg/m³) ST 150 ppm (375 mg/m³)	5000 ppm	Colorless liquid with a pleasant odor. [Note: A gas above 89°F.]	MW: 60.1 BP: 89°F Sol: 30% Fl.P: -2°F IP: 10.82 eV 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 $CH_3CH_2CO[CH_2]_4CH_3$ 541-85-5 MJ7350000 2271 26	Amyl ethyl ketone, Ethyl amyl ketone 1 ppm = 5.33 mg/m³	NIOSH/OSHA 25 ppm (130 mg/m³)	3000 ppm	Colorless liquid with a pungent odor.	MW: 128.2 BP: 315°F Sol: Insoluble Fl.P: 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; III, [#1301, Ketones II]

000157

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Reason prob Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH .2 mg/m³: SA*/SCBA* 5 mg/m³: SA:CF* 10 mg/m³: SCBAF/SAF 100 mg/m³: SCBAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, pulm secretions, chest pain, dysp; asthma	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow Medical attention immed		Resp sys, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Ftg, weak, sleepiness, ll-head; limbs numb, tingle; nau; irrit eyes, skin; [carc]	Eye: Skin: Irr immed Breath: Soap wash prompt Swallow: Resp support Medical attention immed		Skin, CVS, eyes, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: SA*/SCBA* 2500 ppm: SA:CF* 5000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Eye, nose irrit; chest oppression, dysp; vis dist; CNS depres; in animals: pulm edema	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, CNS
Clothing: Any poss Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 250 ppm: SA*/SCBA* 625 ppm: SA:CF*/PAPROV* 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 3000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narco, coma; derm	Eye: Skin: Irr immed Breath: Water flush Swallow: Resp support Medical attention immed		Eyes, skin, resp sys, CNS

5-Methyl-3-heptanone

7353

000158

Chemical name, structure/formula, CAS and RTECS Nos., and 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 hydrazine CH_3NHNH_2 60-34-4 MV5600000 1244 28	Monomethyl hydrazine, MMH 1 ppm = 1.92 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 [50 ppm] ACGIH A2	Fuming, colorless liquid with an ammonia-like odor.	MW: 46.1 BP: 190°F Sol: Miscible Fl.P: 17°F IP: 8.00 eV Sp.Gr(77°F): 0.87 Class IB Flammable Liquid	VP(77°F): 50 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; II(3); [#S149]
Methyl Iodide CH_3I 74-88-4 PA9450000 2644 55	Iodomethane, Monoiodomethane 1 ppm = 5.90 mg/m³	NIOSH Ca See Appendix A 2 ppm (10 mg/m³) [skin] OSHA 2 ppm (10 mg/m³) [skin]	Ca [800 ppm] ACGIH A2	Colorless liquid with a pungent, ether-like odor. [Note: Turns yellow, red, or brown on exposure to light & moisture.]	MW: 141.9 BP: 109°F Sol: 1% Fl.P: NA IP: 9.54 eV Sp.Gr: 2.28 Noncombustible Liquid	VP(77°F): 400 mm FRZ: -88°F UEL: NA LEL: NA	Strong oxidizers [Note: Decomposes at 518°F.]	Char; Toluene; GC/FID; III [#1014]
Methyl isobutyl carbinol $(CH_3)_2CHCH_2CH(OH)CH_3$ 108-11-2 SA7350000 2053 26	Isobutylmethylcarbinol, Methyl amyl alcohol, 4-Methyl-2-pentanol, MIBC 1 ppm = 4.25 mg/m³	NIOSH/OSHA 25 ppm (100 mg/m³) ST 40 ppm (165 mg/m3) [skin]	2000 ppm	Colorless liquid with a mild odor.	MW: 102.2 BP: 271°F Sol: 2% Fl.P: 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/CS₂; GC/FID; III [#1402, Alcohols III]
Methyl Isocyanate CH_3NCO 624-83-9 NQ9450000 2480 30	Methyl ester of isocyanic acid, MIC 1 ppm = 2.37 mg/m³	NIOSH/OSHA 0.02 ppm (0.05 mg/m³) [skin]	20 ppm	Colorless liquid with a sharp, pungent odor.	MW: 57.1 BP: 139°F Sol(59°F): 10% Fl.P: 19°F IP: 10.67 eV Sp.Gr: 0.96 Class IB Flammable Liquid	VP: 348 mm MLT: -49°F UEL: 26% LEL: 5.3%	Water, oxidizers, acids, alkalis, amines, iron, tin, copper	XAD-7; CH_3CN; HPLC/FLD; OSHA [#54]

000159

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards					
		Route	Symptoms (See Table 5)	First aid (See Table 6)			Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Irrit eyes, vomit, diarr, resp sys irrit, tremors, ataxia; anoxia, cyan; convuls, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed		CNS, resp sys, liver, blood, CVS, eyes
Clothing: Repeat Goggles: Reason prob Wash: Immed wet Change: N.R. Remove: Immed non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit; verti, ataxia; slurred speech, drow; derm; eye irrit; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed		CNS, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 625 ppm: SA:CF* 1250 ppm: SCBAF/SAF 2000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Eye irrit; head, drow; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed		Eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH/OSHA 0.2 ppm: SA*/SCBA* 0.5 ppm: SA:CF* 1 ppm: SCBAF/SAF 20 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; cough, secretions, chest pain, dysp; asthma; eye, skin inj; in animals: pulm edema	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed		Resp sys, eyes, skin
Methyl isocyanate							

7353

153

000160

Chemical name, structure/formula, CAS and RTECS Nos., and 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 13	Mercaptomethane, Methanethiol, Methyl sulfhydrate 1 ppm = 2.00 mg/m³	NIOSH C 0.5 ppm (1 mg/m³) [15-min] OSHA 0.5 ppm (1 mg/m³)	400 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(oc): 0°F (Liquid) IP: 9.44 eV Sp.Gr: 0.90 (Liquid at 32°F) Flammable Gas Class IA Flammable Liquid	VP: >1 atm FRZ: -186°F UEL: 21.8% LEL: 3.9%	Strong oxidizers, bleaches	Filter; HCl/CH_3Cl_2; GC/FPD; OSHA [#26]
Methyl methacrylate $CH_2=C(CH_3)COOCH_3$ 80-62-6 OZ5075000 1247 27 (Inhibited)	Methacrylate monomer, Methyl ester of methacrylic acid, Methyl-2-methyl-2-propenoate 1 ppm = 4.16 mg/m³	NIOSH/OSHA 100 ppm (410 mg/m³)	4000 ppm	Colorless liquid with an acrid, fruity odor.	MW: 100.1 BP: 214°F Sol: Slight Fl.P(oc): 50°F IP: 9.70 eV Sp.Gr: 0.94 Class IB Flammable Liquid	VP(77°F): 40 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; III [#2537]
alpha-Methyl styrene $C_6H_5C(CH_3)=CH_2$ 98-83-9 WL5250000 1994 30	AMS, Isopropenyl benzene, 1-Methyl-1-phenylethylene, 2-Phenyl propylene 1 ppm = 4.91 mg/m³	NIOSH/OSHA 50 ppm (240 mg/m³) ST 100 ppm (485 mg/m³)	5000 ppm	Colorless liquid with a characteristic odor.	MW: 118.2 BP: 330°F Sol: Insoluble Fl.P: 129°F IP: 8.35 eV Sp.Gr: 0.91 Class II Combustible Liquid	VP: 2 mm FRZ: -10°F UEL: 6.1% LEL: 1.9%	Oxidizers, peroxides, halogens, catalysts for vinyl or ionic polymers; aluminum, iron chloride, copper [Note: Usually contains an inhibitor such as tert-butyl catechol.]	Char; CS_2; GC/FID; III [#1501, Aromatic Hydrocarbons]
Mica (containing less than 1% quartz), 12001-26-2 VV8760000	Silicate mica	NIOSH/OSHA 3 mg/m³ (resp)	N.E.	Colorless, odorless flakes or sheets of hydrous silicates.	MW: 797(approx) BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.6-3.2 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0600, Nuisance Dust (resp)]

000161

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Prevent freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 5 ppm: SA/SCBA/CCROV 12.5 ppm: SA:CF/PAPROV 25 ppm: SCBAF/SAF/CCRFOV/GMFOV/PAPRTOV/SAT:CF 400 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Narco; cyan; convuls; pulm irrit	Eye: Irr immed Skin: Water flush immed Breath: Resp support		Resp sys, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[t]/CCRFOV 2500 ppm: SA:CF[t] 4000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, upper resp sys, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; drow; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, skin
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 15 mg/m³: DM 30 mg/m³: DMXSQ/SA/SCBA 75 mg/m³: PAPRDM/SA:CF 150 mg/m³: HIEF/PAPRTHIE/SCBAF/SAF/SAT:CF 1500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Pneumoconiosis, cough, dysp; weak; low-wgt	Eye: Irr immed Breath: Fresh air		Lungs
Mica (containing less than 1% quartz)						

7353

155

000162

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Molybdenum (soluble compounds as Mo)	Synonyms vary depending upon the specific soluble compound.	NIOSH See Appendix D OSHA 5 mg/m³	N.E.	Appearance and odor vary depending upon the specific soluble compound.	Properties vary depending upon the specific soluble compound.		Alkali metals, sodium, potassium, molten magnesium	Filter; Acid; ICP; III [#7300, Elements]
Molybdenum (insoluble compounds as Mo) Mo (Metal) 7439-93-7 (Metal) QA4680000 (Metal)	Metal: Molybdenum metal Synonyms of other insoluble compounds vary depending upon the specific compound.	NIOSH See Appendix D OSHA 10 mg/m³	N.E.	Metal: Dark gray or black powder with a metallic luster.	MW: 95.9 BP: 8717°F Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 4752°F UEL: NA LEL: NA	Strong oxidizers	Filter; Acid; ICP; III [#7300, Elements]
					Sp.Gr: 10.28 (Metal) Flammable in form of dust or powder.			
Monomethyl aniline $C_6H_5NHCH_3$ 100-61-8 BY4550000	MA, Methyl aniline, N-Methyl aniline, (Methylamino)benzene, Methylphenyl amine	NIOSH/OSHA 0.5 ppm (2 mg/m³) [skin]	100 ppm	Yellow to light-brown liquid with a weak, ammonia-like odor.	MW: 107.2 BP: 384°F Sol: Insoluble Fl.P: 175°F IP: 7.32 eV	VP(97°F): 1 mm FRZ: -71°F UEL: ? LEL: ?	Strong acids, strong oxidizers	Bub; NaOH; GC/FID; II(3) [#S153]
2294 57	1 ppm = 4.46 mg/m³				Sp.Gr: 0.99 Class IIIA Combustible Liquid			
Morpholine C_4H_8ONH 110-91-8 QD6475000	Diethylene imidoxide; Diethylene oximide; Tetrahydro-1,4-oxazine; Tetrahydro-p-oxazine	NIOSH/OSHA 20 ppm (70 mg/m³) ST 30 ppm (105 mg/m³) [skin]	8000 ppm	Colorless liquid with a weak, ammonia- or fish-like odor. [Note: A solid below 23°F.]	MW: 87.1 BP: 264°F Sol: Miscible Fl.P(oc): 98°F IP: 8.88 eV	VP: 6 mm FRZ: 23°F UEL: 11.2% LEL: 1.4%	Strong acids, strong oxidizers, metals [Note: Corrosive to metals.]	Si gel; H_2SO_4/NaOH; GC/FID; II(3) [#S150]
2054 29	1 ppm = 3.62 mg/m³				Sp.Gr: 1.00 Class IC Flammable Liquid			

156

000163

	Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
	Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	OSHA 25 mg/m³: DM* 50 mg/m³: DMXSQ*/SA*/SCBA* 125 mg/m³: PAPRDM*/SA:CF* 250 mg/m³: HIEF/PAPRTHIE*/SAT:CF*/SCBAF/SAF 2500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: anor; inco; irrit eyes, nose, throat; dysp; anemia	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed		Resp sys; in animals: *kidneys, blood*
	Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	OSHA 50 mg/m³: DM^ 100 mg/m³: DMXSQ^/SA/SCBA 250 mg/m³: PAPRDM^/SA:CF 500 mg/m³: HIEF/PAPRTHIE/SAT:CF/SCBAF/SAF 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA *Escape: HIEF/SCBAE*	Inh Ing	In animals: irrit eyes, nose, *throat; anor, diarr,* low-wgt; listlessness; liver, kidney damage	Breath: Resp support Swallow: Medical attention immed		None known in humans
	Clothing: Reason prob Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam	NIOSH/OSHA 5 ppm: SA/SCBA 12.5 ppm: SA:CF 25 ppm: SCBAF/SAF/SAT:CF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA *Escape: GMFS/SCBAE*	Inh Abs Ing Con	Weak, dizz, head; dysp, cyan; methemoglobinemia; pulm edema; liver, kidney damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, liver, kidneys, blood
	Clothing: Any poss >25%/Repeat <25% Goggles: Any poss Wash: Prompt Contam Change: N.R. Remove: Immed wet (flamm) Provide: 15-25%: Eyewash/ >25%: Quick drench	NIOSH/OSHA 550 ppm: SA:CF£PAPROV£ 1000 ppm: SCBAF/SAF/CCRFOV 8000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Vis dist; nose irrit; cough; resp irrit; eye, skin irrit; liver, kidney, damage	Eye: Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed		Resp sys, eyes, skin
	Morpholine						

7353

157

000164

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Naphtha (coal tar) 8030-30-6 DE3030000 2553 27	Crude solvent coal tar naphtha, High solvent naphtha, Naphtha 1 ppm = 4.57 mg/m³ (approx)	NIOSH/OSHA 100 ppm (400 mg/m³)	10,000 ppm [LEL]	Reddish-brown, mobile liquid with an aromatic odor.	MW: 110(approx) BP: 320-428°F Sol: Insoluble Fl.P: 100-109°F IP: ? Sp.Gr: 0.89-0.97 Class II Combustible Liquid	VP: <5 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; III [#1550]
Naphthalene $C_{10}H_8$ 91-20-3 QJ0525000 1334 32	Naphthalin, Tar camphor, White tar	NIOSH/OSHA 10 ppm (50 mg/m³) ST 15 ppm (75 mg/m³)	500 ppm	Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.]	MW: 128.2 BP: 424°F Sol: 0.003% Fl.P: 174°F IP: 8.12 eV 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; III [#1501, Aromatic Hydrocarbons]
alpha-Naphthylamine $C_{10}H_7NH_2$ 134-32-7 QM1400000 2077 55	1-Aminonaphthalene, 1-Naphthylamine	NIOSH Ca See Appendix A OSHA [1910.1004] See Appendix B	Ca	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(77°F): 1.12 Combustible Solid	VP(220°F): 1 mm MLT: 122°F UEL: ? LEL: ?	Oxidizes in air	Filter/ Si gel; CH_3COOH/ 2-Propanol; GC/FID; III [#5518]
beta-Naphthylamine $C_{10}H_7NH_2$ 91-59-8 QM2100000 1650 55	2-Aminonaphthalene, 2-Naphthylamine 000165	NIOSH Ca See Appendix A OSHA [1910.1009] See Appendix B ACGIH A1	Ca	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): 1 mm MLT: 232°F UEL: ? LEL: ?	None reported	Filter/ Si gel; CH_3COOH/ 2-Propanol; GC/FID; III [#5518]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards					
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)	
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 1000 ppm: PAPROV[¢]/CCRFOV 2500 ppm: SA:CF[£] 5000 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, drow; irrit eyes, nose, skin; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, eyes, skin	
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 100 ppm: CCROVDM*/SA*/SCBA* 250 ppm: SA:CF*/PAPROVDM* 500 ppm: CCRFOVHiE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Eye irrit; head; conf, excitement, mal; nau, vomit, abdom pain; irrit bladder; profuse sweat; jaun; hema, hemog, renal shutdown; derm	Eye: Skin: Breath: Swallow:	Irr immed Molten: flush immed/ Sol-Liq: soap wash prompt Resp support Medical attention immed	Eyes, blood, liver, kidneys, skin, RBC, CNS	
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBA	Inh Abs Ing Con	Derm; hemorrhagic cystitis; dysp, ataxia, methemoglobinemia; hema; dysuria; [carc]	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Resp support Medical attention immed	Bladder, skin	
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBA	Inh Abs Con Ing	Derm; hemorrhagic cystitis; dysp; ataxia; methemoglobinemia, hema; dysuria; [carc]	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Resp support Medical attention immed	Bladder, skin	

beta-Naphthylamine

7353

159

000166

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Nickel carbonyl (as Ni) $Ni(CO)_4$ 13463-39-3 QR6300000 1259 28	Nickel tetracarbonyl 1 ppm = 7.10 mg/m³	NIOSH Ca See Appendix A 0.001 ppm (0.007 mg/m³) OSHA 0.001 ppm (0.007 mg/m³)	Ca [7 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; HGA; III [#6007]
Nickel metal and other compounds (as Ni) Ni 7440-02-0 (Metal) QR5950000 (Metal)	Metal: Elemental nickel Synonyms of other compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A 0.015 mg/m³ OSHA 0.1 mg/m³) (soluble cmpds) 1 mg/m³ (metal & insoluble cmpds)	Ca [N.E.]	Metal: Lustrous, silvery solid.	MW: 58.7 BP: 5139°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 8.90 Noncombustible Solid in bulk form.	VP: 0 mm (approx) MLT: 2831°F UEL: NA LEL: NA	Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate	Filter; Acid; ICP; III [#7300, Elements]
Nicotine $C_5H_4NC_4H_7NCH_3$ 54-11-5 QS5250000 1654 55	3-(1-Methyl-2-pyrrolidyl) pyridine 1 ppm = 6.74 mg/m³	NIOSH/OSHA 0.5 mg/m³ [skin]	35 mg/m³	Pale-yellow to dark brown liquid with a fish-like odor when warm. [insecticide]	MW: 162.2 BP: 482°F (Decomposes) Sol: Miscible Fl.P: 203°F IP: 8.01 eV Sp.Gr: 1.01 Class IIIB Combustible Liquid	VP: 0.08 mm FRZ: -110°F UEL: 4.0% LEL: 0.7%	Strong oxidizers, strong acids	XAD-2; Ethyl acetate; GC/Alk-FID; II(3) [#S293]
Nitric acid HNO_3 7697-37-2 QU5775000 1760 60 (<40% acid soln) 2031 44 (>40% acid soln) 2032 44 (fuming)	Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA) 1 ppm = 2.62 mg/m³	NIOSH/OSHA 2 ppm (5 mg/m³) ST 4 ppm 10 mg/m³	100 ppm	Colorless, yellow, or red fuming liquid with an acrid, suffocating odor.	MW: 63.0 BP: 181°F Sol: Miscible Fl:P: NA IP: 11.95 eV Sp.Gr(77°F): 1.50 Noncombustible Liquid,	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; III [#7903, Inorganic Acids]

[Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid with excess dissolved nitrogen.]

but increases the flammability of combustible materials.

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	Repeat N.R. Prompt contam After work if reason prob contam Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Sens derm, allergic asthma, pneuitis; [carc]	Skin: Breath: Swallow:	Water flush immed Resp support Medical attention immed	Nasal cavities, lungs, skin
Clothing: Goggles: Wash: Change: Remove:	Any poss Any poss Immed wet N.R. Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Head, verti; nau, vomit, epigastric pain; substernal pain; cough, hyperpnea; cyan; weak; leucyt, pneuitis; delirium, convuls; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Lungs, paranasal sinus, CNS
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH/OSHA 5 mg/m³: SA/SCBA 12.5 mg/m³: SA:CF* 25 mg/m³: SCBAF/SAF/SAT:CF* 35 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, salv, abdom pain, vomit, diarr; head, dizz, disturb hearing, vision; conf, weak, inco; paroxysmal atrial fibri; convuls, dysp	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CNS, CVS, lungs, GI tract
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss pH <2.5/Repeat pH >2.5 Any poss Immed contam N.R. Immed non-imperv contam pH <2.5: Eyewash, quick drench	NIOSH/OSHA 50 ppm: SA:CF* 100 ppm: SCBAF/SAF/GMFS⁴/CCRFS⁴ §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS⁴/SCBAE	Inh Ing Con	Irrit eyes, muc memb, skin; delayed pulm edema, pneuitis, bron; dental erosion	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, skin, teeth

Nitric acid

7353

161

000168

7353

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Nitric oxide NO 10102-43-9 QX0525000 1660 20	Mononitrogen monoxide, Nitrogen monoxide 1 ppm = 1.25 mg/m³	NIOSH/OSHA 25 ppm (30 mg/m³)	100 ppm	Colorless gas.	MW: 30.0 BP: -241°F Sol: 5% Fl.P: NA IP: 9.27 eV Nonflammable Gas, but will accelerate the burning of combustible materials.	VP: >1 atm FRZ: -263°F UEL: NA LEL: NA	Combustible materials, ozone, chlorinated hydrocarbons, ammonia, carbon disulfide, metals, fluorine [Note: Reacts with water to form nitric acid.]	Mol-sieve*; Reagent; Vis; II(1) [P&CAM #231]
p-Nitroaniline $NO_2C_6H_4NH_2$ 100-01-6 BY7000000 1661 55	para-Aminonitrobenzene, 4-Nitroaniline, 4-Nitrobenzenamine, p-Nitrophenylamine, PNA	NIOSH/OSHA 3 mg/m³ [skin]	300 mg/m³	Bright yellow, crystalline powder with a slight ammonia-like odor.	MW: 138.1 BP: 630°F Sol: 0.08% Fl.P: 390°F IP: 8.85 eV Sp.Gr: 1.42 Combustible Solid	VP(288°F): 1 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; II(5) [#S7]
Nitrobenzene $C_6H_5NO_2$ 98-95-3 DA6475000 1662 55	Essence of mirbane, Nitrobenzol, Oil of mirbane 1 ppm = 5.12 mg/m³	NIOSH/OSHA 1 ppm (5 mg/m³) [skin]	200 ppm	Yellow, oily liquid with a pungent odor like paste shoe polish. [Note: A solid below 42°F.]	MW: 123.1 FRZ: 411°F Sol: 0.2% Fl.P: 190°F IP: 9.92 eV Sp.Gr: 1.20 Class IIIA Combustible Liquid	VP(112°F): 1 mm FRZ: 42°F UEL: ? LEL(200°F): 1.8%	Concentrated nitric acid, nitrogen tetroxide, caustics, phosphorus pentachloride, chemically-active metals such as tin or zinc	Si gel; Methanol; GC/FID; III [#2005]
4-Nitrobiphenyl $C_6H_5C_6H_4NO_2$ 92-93-3 DV5600000	p-Nitrobipheny, p-Nitrodiphenyl, 4-Nitrodiphenyl, 4-Phenylnitrobenzene, p-Phenylnitrobenzene, PNB	NIOSH Ca See Appendix A OSHA [1910.1003] See Appendix B ACGIH A1	Ca	White to yellow, needle-like crystalline solid with a sweetish odor.	MW: 199.2 BP: 644°F Sol: Insoluble Fl.P: 290°F IP: ? Combustible Solid	VP: ? MLT: 237°F UEL: ? LEL: ?	Strong reducers	Filter/ Si gel(2); 2-Propanol; GC/FID; II(4) [P&CAM #273]

000169

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 100 ppm: SA:CF*/PAPRS*‡/SA*/SCBA*/CCRFS‡/GMFS‡ §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS‡/SCBAE	Inh Con	Irrit eyes, nose, throat; drow; unconscious	Breath:	Resp support	Resp sys
Clothing: Repeat Goggles: Reason prob Wash: Immed contam/daily Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 30 mg/m³: SA*/SCBA* 75 mg/m³: SA:CF* 150 mg/m³: SCBAF/SAF 300 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVDMFu/SCBAE	Inh Abs Ing Con	Cyan, ataxia; tacar, tachypnea; dysp; irrity; vomit, diarr; convuls; resp arrest; anemia; methemoglobinemia	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Blood, heart, lungs, liver
Clothing: Any poss Goggles: Reason prob Wash: N.R. Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 10 ppm: CCROV*/SA*/SCBA* 25 ppm: SA:CF*/PAPROV* 50 ppm: CCRFOV/GMFOV/SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia; irrit eyes; derm; anemia; *in animals: liver, kidney* damage	Eye: Irr immed Skin: Soap wash immed *Breath: Resp support* Swallow: Medical attention immed		Blood, liver, kidneys, CVS, *skin*
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Head, lethargy, dizz; *dysp; ataxia, weak;* methemoglobinemia; urinary burning; acute hemorrhagic cystitis; [carc]	Eye: Irr immed *Skin:* Soap wash immed Breath: Resp support Swallow: Medical attention immed		Bladder, blood

4-Nitrobiphenyl

7353

000170

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
p-Nitrochlorobenzene $ClC_6H_4NO_2$ 100-00-5 CZ1050000 1578 55	p-Chloronitrobenzene, 4-Chloronitrobenzene, 1-Chloro-4-nitrobenzene, PCNB, PNCB	NIOSH Ca See Appendix A [skin] OSHA 1 mg/m³ [skin]	Ca [1000 mg/m³]	Yellow crystalline solid with a sweet odor.	MW: 157.6 BP: 468°F Sol: Insoluble Fl.P: 261°F IP: 9.96 eV Sp.Gr: 1.52 Solid that does not burn, or burns with difficulty.	VP: ? MLT: 182°F UEL: ? LEL: ?	Strong oxidizers	SI gel; Methanol; GC/FID; III [#2005, Nitrobenzenes]
Nitroethane $CH_3CH_2NO_2$ 79-24-3 K15600000 2842 26	None 1 ppm = 3.12 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% Fl.P: 82°F IP: 10.88 eV Sp.Gr: 1.05 Class IC Flammable Liquid	VP: 16 mm FRZ: -130°F UEL: ? LEL: 3.4%	Amines; strong acids, alkalis & oxidizers; hydrocarbons; combustibles; metal oxides	XAD-2(2); Ethyl acetate; GC/FID; III [#2526]
Nitrogen dioxide NO_2 10102-44-0 QW9800000 1067 20	Dinitrogen tetroxide, Nitrogen peroxide, Nitrogen tetroxide, NTO 1 ppm = 1.91 mg/m³	NIOSH/OSHA ST 1 ppm (1.8 mg/m³)	50 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 Fl.P: NA IP: 9.75 eV Sp.Gr: 1.44 (Liquid at 68°F) 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.]	Palmes Tube; Reagent; Vis; III [#6700]
Nitrogen trifluoride NF_3 7783-54-2 QX1925000 2451 15	Trifluoramine, Trifluorammonia 1 ppm = 2.95 mg/m³	NIOSH/OSHA 10 ppm (29 mg/m³)	2000 ppm	Colorless gas with a moldy odor. [Note: Shipped as a liquefied compressed gas.]	MW: 71.0 BP: -200°F Sol: Insoluble Fl.P: NA IP: 12.97 eV 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

000171

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing:	Reason prob	NIOSH	Inh	Anoxia; unpleasant taste;	Eye:	Irr immed	Blood, liver,
Goggles:	Reason prob	¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	mild anemia; [carc]	Skin:	Soap wash immed	kidneys, CVS
Wash:	Immed wet/Prompt contam/daily	Escape: HiEF/SCBAE	Ing	in animals: hema, hemog	Breath:	Resp support	
Change:	After work if reason prob contam		Con		Swallow:	Medical attention immed	
Remove:	Immed non-imperv wet/ Prompt non-imperv contam						
Provide:	Quick drench						

7353

Clothing:	Repeat	NIOSH/OSHA	Inh	Derm;	Eye:	Irr immed	Skin
Goggles:	Reason prob	1000 ppm: SCBAF/SAF	Con	in animals: lac; dysp,	Skin:	Soap wash prompt	
Wash:	Prompt wet	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Ing	pulm rales, edema; liver,	Breath:	Resp support	
Change:	N.R.	Escape: SCBAE		kidney inj; narco	Swallow:	Medical attention immed	
Remove:	Immed wet (flamm)						

165

Clothing:	Any poss	NIOSH/OSHA	Inh	Cough, mucoid frothy	Eye:	Irr immed	Resp sys, CVS
Goggles:	Any poss	25 ppm: SA:CF[£]	Ing	sputum, dysp; chest pain;	Skin:	Water flush immed	
Wash:	Immed contam	50 ppm: SCBAF/SAF	Con	pulm edema, cyan,	Breath:	Resp support	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		tachypnea, tacar;	Swallow:	Medical attention	
Remove:	Immed non-imperv contam	Escape: GMFS[¢]/SCBAE		eye irrit		immed	
Provide:	Eyewash, quick drench						

Clothing:	N.R.	NIOSH/OSHA	Inh	In animals: methemoglobin;	Breath:	Resp support	In animals:
Goggles:	N.R.	100 ppm: SA/SCBA/CCRS		anoxia, cyan; weak, dizz,			blood
Wash:	N.R.	250 ppm: SA:CF/PAPRS		head; liver, kidney inj			
Change:	N.R.	500 ppm: SCBAF/SAF/CCRFS/GMFS/ SAT:CF*/PAPRTS*					
Remove:	N.R.	2000 ppm: SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFS/SCBAE					

000172

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Nitroglycerine $CH_2NO_3CHNO_3CH_2NO_3$ 55-63-0 QX2100000 3064 26	Glyceryl trinitrate; NG; 1,2,3-Propanetriol trinitrate; Trinitroglycerine 1 ppm = 9.44 mg/m³	NIOSH/OSHA ST 0.1 mg/m³ [skin] [Note: OSHA stayed the start-up date for the PEL on 12/6/89 for the explosives industry until 2/1/90.]	500 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 (60-60%).]	MW: 227.1 BP: Begins to decompose at 122-140°F Sol: 0.1% Fl.P: Explodes IP: ? Sp.Gr: 1.60 Class IIIB Combustible Liquid	VP: 0.0003 mm FRZ: 56°F UEL: ? LEL: ?	Heat, ozone, shock, acids	Tenax GC; Ethanol; GC/ECD; III; [02507]
Nitromethane CH_3NO_2 75-52-5 PA9800000 1261 26	Nitrocarbol 1 ppm = 2.54 mg/m³	NIOSH See Appendix D OSHA 100 ppm (250 mg/m³)	1000 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; III [02527]
1-Nitropropane $CH_3CH_2CH_2NO_2$ 108-03-2 TZ5075000 2608 26	Nitropropane, 1-NP 1 ppm = 3.70 mg/m³	NIOSH/OSHA 25 ppm (90 mg/m³)	2300 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 [046]
2-Nitropropane $CH_3CH(NO_2)CH_3$ 79-46-9 TZ5250000 2608 26	Dimethylnitromethane, sec-Nitropropane, iso-Nitropropane, 2-NP 1 ppm = 3.70 mg/m³	NIOSH Ca See Appendix A Reduce exposure to lowest feasible concentration. OSHA 10 ppm (35 mg/m³)	Ca [2300 ppm] ACGIH C 10 ppm, A2 (35 mg/m³)	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; III [02528]

000173

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed wet (flamm) Provide: Quick drench	NIOSH/OSHA 1 mg/m³: SA*/SCBA* 2.5 mg/m³: SA/CF* 5 mg/m³: SCBAF/SAF/SAT:CF* 200 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; methemoglobin; delirium, depres CNS; angina; skin irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CVS, blood, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	OSHA 1000 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con Ing	Derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin
Clothing: N.R. Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 250 ppm: SA*/SCBA* 625 ppm: SA:CF* 1250 ppm: SCBAF/SAF 2300 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con Ing	Eye irrit, head, nau, vomit, diarr	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, CNS
Clothing: N.R. Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con Ing	Head, anor, nau, vomit, diarr, irrit resp sys, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, CNS

7353

167

000174

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
N-Nitrosodimethylamine $(CH_3)_2N_2O$ 62-75-9 IQ0525000	Dimethylnitrosamine; N,N-Dimethylnitrosamine; DMNA; N-Methyl-N-nitroso-methanamine; NDMA; N-Nitrosodimethylamine 1 ppm = 3.08 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1016] See Appendix B ACGIH A2 [skin]	Ca	Yellow, oily liquid with a faint, characteristic odor.	MW: 74.1 BP: 306°F Sol: Soluble Fl.P: ? IP: 8.69 eV Sp.Gr: 1.00 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; III [#2522]
Nitrotoluene $NO_2C_6H_4CH_3$ o: 88-72-2 XT3150000 m: 99-08-1 XT2975000 p: 99-99-0 XT3325000 1664 55	Methyl nitrobenzene, Nitrotoluol o: ortho-Nitrotoluene 2-Nitrotoluene m: meta-Nitrotoluene 3-Nitrotoluene p: para-Nitrotoluene 4-Nitrotoluene 1 ppm = 5.70 mg/m³	NIOSH/OSHA 2 ppm (11 mg/m³) [skin]	200 ppm	Yellow liquids (o-, m-isomers) or crystalline solid (p-isomer) with a weak, aromatic odor.	MW: 137.1 BP: 432/450/460°F Sol: 0.07/0.05/0.04% Fl.P: 223/232/223°F IP: 9.43/9.48/9.50 eV Sp.Gr: 1.16/1.16/1.12 Class IIIB Combustible Liquids	VP(122°F): 1/1/1 mm FRZ/MLT: 25/59/126°F UEL: ? LEL: ?	Strong oxidizers, sulfuric acid	Si gel; Methanol; GC/FID; III [#2005, Nitrobenzenes]
Octachloronaphthalene $C_{10}Cl_8$ 2234-13-1 QK0250000	Halowax® 1051; 1,2,3,4,5,6,7,8-Octachloronaphthalene; Perchloronaphthalene	NIOSH/OSHA 0.1 mg/m³ ST 0.3 mg/m³ [skin]	Unknown	Waxy, pale-yellow solid with an aromatic odor.	MW: 403.7 BP: 824°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 2.00 Noncombustible Solid	VP: ? MLT: 378°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/FID; II(2) [#S97]
Octane $CH_3[CH_2]_6CH_3$ 111-65-9 RG8400000 1262 27	n-Octane, normal-Octane 1 ppm = 4.75 mg/m³	NIOSH 75 ppm (350 mg/m³) C 385 ppm (1800 mg/m³) [15-min] OSHA 300 ppm (1450 mg/m³) ST 375 ppm (1800 mg/m³)	5000 ppm 000175	Colorless liquid with a gasoline-like odor.	MW: 114.2 BP: 258°F Sol: Insoluble 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; III [#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)
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: 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; reduced function of liver, kidneys, lungs; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Liver, kidneys, lungs
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 20 ppm: SA*/SCBA* 50 ppm: SA:CF* 100 ppm: SCBAF/SAF/SAT:CF* 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: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Blood, CNS, CVS, skin, GI tract
Clothing: Any poss molt/ Reason prob sol-liq Goggles: Any poss molt/ Reason prob sol-liq Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Immed non-imperv contam molt/ Prompt non-imperv contam sol-liq	NIOSH/OSHA 1 mg/m³: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Acne-form derm; liver damage, jaun	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Skin, liver
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 750 ppm: SA*/SCBA* 1875 ppm: SA:CF* 3750 ppm: SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose; drow; derm; chemical pneu	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, eyes, resp sys

Octane

7353

169

000176

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement methods (See Table 1)
					MW, BP, SOL, FI.P, IP, Sp.Gr, flammability	VP, FRZ, UEL, LEL		
Oil mist (mineral) 8012-95-1 PY8030000 2490 55	Heavy mineral oil mist, Paraffin oil mist, White mineral oil mist	NIOSH 5 mg/m³ ST 10 mg/m³ OSHA 5 mg/m³	N.E.	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): 275-500°F IP: ? Sp.Gr: 0.90 Class IIIB Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	None reported	Filter: CFC-113; IR; III [05026]
Osmium tetroxide (as Os) OsO_4 20816-12-0 RN1140000 2471 55	Osmic acid anhydride, Osmium oxide	NIOSH/OSHA 0.002 mg/m³ (0.0002 ppm) ST 0.006 mg/m³ (0.0006 ppm)	1 mg/m³	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% Fl.P: NA IP: 12.60 eV Sp.Gr: 5.10 Noncombustible Solid	VP(81°F): 11 mm MLT: 105°F UEL: NA LEL: NA	Hydrochloric acid, easily oxidized organic materials [Note: Begins to sublime below BP.]	None available
Oxalic acid $HOOCCOOH \cdot 2H_2O$ 144-62-7 RO2450000 2449 54	Ethanedioic acid, Oxalic acid (aqueous), Oxalic acid dihydrate	NIOSH/OSHA 1 mg/m³ ST 2 mg/m³	500 mg/m³	Colorless, odorless powder or granular solid. [Note: The anhydrous form $(COOH)_2$ is an odorless, white solid.]	MW: 126.1 BP: Sublimes Sol: 14% Fl.P: ? IP: ? Sp.Gr: 1.65 Combustible Solid	VP: <0.001 mm MLT: 373°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers, silver compounds	None available
Oxygen difluoride OF_2 7783-41-7 RS2100000 2190 20	Difluorine monoxide, Fluorine monoxide, Oxygen fluoride 1 ppm = 2.24 mg/m³	NIOSH/OSHA C 0.05 ppm (0.1 mg/m³)	0.5 ppm	Colorless gas with a peculiar, foul odor.	MW: 54.0 BP: -230°F Sol: 0.02% Fl.P: NA IP: 13.11 eV 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

000177

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: N.R. Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 50 mg/m³: SA/SCBA/HiE 125 mg/m³: SA:CF/PAPRHiE 250 mg/m³: HiEF/PAPRTHiE/SAT:CF/SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	None reported	Skin: Breath:	Soap wash Fresh air	Resp sys, skin
Clothing: Reason prob Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 0.1 mg/m³: SCBAF/SAF/CCRFSHiE/GMFSHiE 1 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Ing Con	Lac, vis dist, conj; head; cough; dysp; derm	Eye: Skin Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, skin
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 25 mg/m³: PAPRDM[c]/SA:CF[c] 50 mg/m³: HiEF/SCBAF/SAF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Irrit eyes, muc memb, skin; eye burns; local pain, cyan; shock, collapse, convuls	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Resp sys, skin, kidneys, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 0.5 ppm: SCBA/SA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[d]/SCBAE	Inh Con	Intractable head; resp sys irrit, pulm edema; eye, skin burns	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	Lungs, eyes

Oxygen difluoride

7353

171

000178

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Ozone O_3 10028-15-6 RS8225000	Triatomic oxygen 1 ppm = 2.00 mg/m³	NIOSH C 0.1 ppm (0.2 mg/m³) OSHA 0.1 ppm (0.2 mg/m³) ST 0.3 ppm (0.6 mg/m³)	10 ppm	Colorless to blue gas with a very pungent odor.	MW: 48.0 BP: -169°F Sol: Insoluble Fl.P: NA IP: 12.52 eV Nonflammable Gas, but a powerful oxidizer.	VP: >1 atm FRZ: -315°F UEL: NA LEL: NA	All oxidizable materials (both organic & inorganic)	Imp; Reagent; Vis; II(1) [P&CAM #154]
Paraquat $(CH_3(C_5H_4N)_2CH_3)\cdot 2Cl$ 1910-42-5 DW2275000 2588 53 (solid pesticides)	1,1'-Dimethyl-4,4'-bipyridinium dichloride; N,N'-Dimethyl-4,4'-bipyridinium dichloride; Paraquat chloride; Paraquat dichloride	NIOSH/OSHA 0.1 mg/m³ (resp) [skin]	1.5 mg/m³	Yellow solid with a faint ammonia-like odor. [herbicide] [Note: Paraquat may also be found commercially as a methyl sulfate salt $C_{12}H_{14}N_2\cdot 2CH_3SO_4$.]	MW: 257.2 BP: 347-356°F (Decomposes) Sol: Miscible Fl.P: NA IP: ? Sp.Gr: 1.24 Noncombustible Solid	VP: Low MLT: ? UEL: NA LEL: NA	Strong oxidizers, alkylaryl-sulfonate wetting agents [Note: Corrosive to *metals. Decomposes* in presence of ultraviolet light.]	Filter; Water; HPLC/UVD; III [#5003]
Parathion $(C_2H_5O)_2P(S)OC_6H_4NO_2$ 56-38-2 TF4550000 2783 55 (liquid/dry)	O,O-Diethyl-O(p-nitrophenyl) phosphorothioate; *Diethyl parathion*; Ethyl parathion; Parathion-ethyl 1 ppm = 12.11 mg/m³	NIOSH 0.05 mg/m³ *[skin]* OSHA 0.1 mg/m³ [skin]	20 mg/m³	Pale-yellow to dark brown liquid *with a garlic-like odor.* [Note: A solid below 43°F. Pesticide that may be absorbed on a dry carrier.]	MW: 291.3 BP: 707°F Sol: 0.001% Fl.P: ? IP: ? Sp.Gr: 1.27 Combustible Liquid, but may be difficult to ignite.	VP: 0.00004 mm FRZ: 43°F UEL: ? LEL: ?	Strong oxidizers	Filter; Isooctane; GC/FPD; III [#5012]
Pentaborane B_5H_9 19624-22-7 RY8925000 1380 75	Pentaboron nonahydride, Stable pentaborane 1 ppm = 2.62 mg/m³	NIOSH/OSHA 0.005 ppm (0.01 mg/m³) ST 0.015 ppm (0.03 mg/m³)	3 ppm	Colorless liquid with a pungent odor like sour milk.	MW: 63.1 BP: 140°F Sol: Reacts Fl.P: 86°F IP: 9.90 eV Sp.Gr: 0.62 Class IC Flammable Liquid	VP(77°F): 200 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

000179

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 1 ppm: SA/SCBA/CCRS[4] 2.5 ppm: SA:CF/PAPRS[4] 5 ppm: CCRFS[4]/GMFS[4]/SCBAF/SAF/SAT:CF 10 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[4]/SCBAE	Inh	Irrit eyes, muc memb; pulm edema; chronic resp disease	Eye: Breath:	Medical attention Fresh air, 100% O_2	Eyes, resp sys
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Reason prob Immed contam N.R. Immed non-imperv contam Quick drench	NIOSH/OSHA 1 mg/m³: CCROVDMFu*/SA*/SCBA* 1.5 mg/m³: CCRFOVDMFu/SA:CF*/SCBAF/SAF/PAPROVDMFu* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, epis; derm; fingernail damage; irrit GI tract; heart, liver, kidney damage; acute pulm inflamm	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, heart, liver, kidneys, GI tract
Clothing: Goggles: Wash: Change: Remove: Provide:	Repeat Any poss Immed contam After work if any poss contam Immed non-imperv contam Eyewash, quick drench	NIOSH 0.5 mg/m³: CCROVDMFu/SA/SCBA 1.25 mg/m³: SA:CF/PAPROVDMFu 2.5 mg/m³: CCROVHIE/SCBAF/SAF/PAPRTOVHIE/SAT:CF 20 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Miosis; rhin; head; tight chest, wheez, lar spasm, salv, cyan; anor, nau, vomit, abdom cramps, diarr; sweat; musc fasc, weak, para; gidd, conf, ataxia; convuls, coma; low BP; card irregularities; skin, eye irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, CNS, CVS, eyes, skin, blood chol
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Any poss Immed wet N.R. Immed wet (flamm) Eyewash, quick drench	NIOSH/OSHA 0.05 ppm: SA/SCBA 0.125 ppm: SA:CF 0.25 ppm: SCBAF/SAF/SAT:CF 3 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Dizz, head, drow, li-head; inco, tremor, tonic spasm face, neck, abdom, limbs; convuls; irrit eyes, skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, eyes, skin

Pentaborane

7353

173

000180

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
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 Fl.P: 180°F IP: ? Sp.Gr: 1.73 Combustible Solid	VP: <1 mm MLT: 335°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; Isooctane; GC/ECD; II(2) [#S96]
Pentachlorophenol C_6Cl_5OH 87-86-5 SM6300000 2020 53	PCP; Penta; 2,3,4,5,6-Pentachlorophenol	NIOSH/OSHA 0.5 mg/m³ [skin]	150 mg/m³	Colorless to white, crystalline solid with a benzene-like odor. [fungicide]	MW: 266.4 BP: 588°F Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 1.98 Noncombustible Solid	VP: 0.0001 mm MLT: 374°F UEL: NA LEL: NA	Strong oxidizers	Filter/Bub; Methanol; HPLC/UVD; III [#5512]
n-Pentane $CH_3[CH_2]_3CH_3$ 109-66-0 RZ9450000 1265 27	Pentane, normal-Pentane 1 ppm = 3.00 mg/m³	NIOSH 120 ppm (350 mg/m³) C 610 ppm (1800 mg/m³) [15-min] OSHA 600 ppm (1800 mg/m³) ST 750 ppm (2250 mg/m³)	15,000 ppm [LEL]	Colorless liquid with a gasoline-like odor. [Note: A gas above 97°F. May be utilized as a fuel.]	MW: 72.2 BP: 97°F Sol: 0.04% Fl.P: -57°F IP: 10.34 eV Sp.Gr: 0.63 Class IA Flammable Liquid	VP(65°F): 400 mm FRZ: -202°F UEL: 7.8% LEL: 1.5%	Strong oxidizers	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
2-Pentanone $CH_3COCH_2CH_2CH_3$ 107-87-9 SA7875000 1249 26	Ethyl acetone, Methyl propyl ketone, MPK 1 ppm = 3.58 mg/m³	NIOSH 150 ppm (530 mg/m³) OSHA 200 ppm (700 mg/m³) ST 250 ppm (875 mg/m³)	5000 ppm	Colorless to water-white liquid with a characteristic acetone-like odor.	MW: 86.1 BP: 215°F Sol: 6% Fl.P: 45°F IP: 9.39 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 16 mm FRZ: -108°F UEL: 8.2% LEL: 1.5%	Oxidizers, bromine trifluoride	Char; CS_2; GC/FID; III [#1300, Ketones I]

000181

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss molt/Repeat sol-liq Goggles: Any poss molt/Reason prob sol-liq Wash: Prompt contam Change: After work if reason prob contam Remove: Immed non-imperv contam molt/ Prompt non-imperv contam sol-liq	NIOSH/OSHA 5 mg/m³: SA*/SCBA* §: 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
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 5 mg/m³: CCROVDMFu*/SA*/SCBA* 12.5 mg/m³: SA:CF*/PAPROVDMFu* 25 mg/m³: CCRFOVHiE/SCBAF/SAF 150 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; sneezing, cough; weak, anor, low-wgt; sweat; head, dizz; nau, vomit; dysp, chest pain; high fever; derm	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	CVS, resp sys, eyes, liver, kidneys, skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 1200 ppm: SA/SCBA 3000 ppm: SA:CF 6000 ppm: SCBAF/SAF/SAT:CF 15,000 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Drow; irrit eyes, nose; derm; chemical pneu	Eye: Skin: Breath: Swallow: Irr immed Water wash prompt Resp support Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 1000 ppm: CCROV*/PAPROV* 1500 ppm: SA*/SCBA* 3750 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; derm; narco, coma	Eye: Skin: Breath: Swallow: Irr immed Water flush Resp support Medical attention immed	Resp sys, eyes, skin, CNS

7353

000182

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Perchloromethyl mercaptan Cl_3CSCl 594-42-3 PB0370000 1670 55	PMM, Trichloromethane sulfenyl chloride, Trichloromethyl sulfur chloride 1 ppm = 7.73 mg/m³	NIOSH/OSHA 0.1 ppm (0.8 mg/m³)	10 ppm	Pale-yellow, oily liquid with an unbearable acrid odor.	MW: 185.9 BP: 297°F (Decomposes) Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 1.69 Noncombustible Liquid, but will support combustion.	VP: 65 mm FRZ: ? UEL: NA LEL: NA	Alkalis, amines, hot iron, water [Note: Corrosive to most metals.]	None available
Perchloryl fluoride ClO_3F 7616-94-6 SD1925000 1955 15	Chlorine fluoride oxide, Chlorine oxyfluoride, Trioxychlorofluoride 1 ppm = 4.26 mg/m³	NIOSH/OSHA 3 ppm (14 mg/m³) ST 6 ppm (28 mg/m³)	385 ppm	Colorless gas with a characteristic, sweet odor. [Note: Shipped as a liquefied compressed gas.]	MW: 102.5 BP: -52°F Sol: 0.06% Fl.P: NA IP: 13.60 eV Nonflammable Gas, but will support combustion.	VP: >1 atm FRZ: -234°F UEL: NA LEL: NA	Combustibles, strong bases, amines, finely divided metals, oxidizable materials, reducing agents, alcohols	None available
Petroleum distillates (naphtha) 8002-05-9 SE7449000 1255 27	Aliphatic petroleum naphtha, Petroleum naphtha 1 ppm = 4.11 mg/m³ (approx)	NIOSH 350 mg/m³ C 1800 mg/m³ [15-min] OSHA 400 ppm (1600 mg/m³)	10,000 ppm	Colorless liquid with a gasoline- or kerosene-like odor. [Note: A mixture of paraffins (C_5 to C_{13}) that may contain a small amount of aromatic hydrocarbons.]	MW: 99(approx) BP: 86-460°F Sol: Insoluble Fl.P: -40 to -86°F IP: ? Sp.Gr: 0.63-0.66 Flammable Liquid	VP: 40 mm (approx) FRZ: ? UEL: 5.9% LEL: 1.1%	Strong oxidizers	Char; CS_2; GC/FID; III [#1550, Naphtha]
Phenol C_6H_5OH 108-95-2 SJ3325000 1671 55 (solid) 2312 55 (molten) 2821 55 (soln)	Carbolic acid, Hydroxybenzene, Monohydroxy benzene, Phenyl alcohol, Phenyl hydroxide	NIOSH 5 ppm (19 mg/m³) C 15.6 ppm (60 mg/m³) [15-min] [skin] OSHA 5 ppm (19 mg/m³) [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% Fl.P: 175°F IP: 8.50 eV Sp.Gr: 1.06 Combustible Solid	VP: 0.4 mm MLT: 109°F UEL: ? LEL: 1.8%	Strong oxidizers, calcium hypochlorite, aluminum chloride, acids	XAD-7; Methanol; HPLC/UVD OSHA [#32]

000183

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 1 ppm: SA*/SCBA*/CCROV* 2.5 ppm: SA:CF*/PAPROV* 5 ppm: CCRFOV/GMFOV/SCBAF/SAF/SAT:CF*/PAPRTOV* 10 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Lac, eye inflamm; irrit nose, throat; cough; dysp, deep breath pain, coarse rales; vomit; pallor, tacar; acidosis; anuria	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, liver, kidneys, skin
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed non-imperv contam	NIOSH/OSHA 30 ppm: SA/SCBA 75 ppm: SA:CF* 150 ppm: SCBAF/SAF 385 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[4]/SCBAE	Inh Con	Resp irrit; skin burns; in animals: methemoglobin; anoxia; cyan; weak, dizz, head; pulm edema; pneuitis	Eye: Breath: Irr immed Resp support		Resp sys, skin, blood
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH 850 ppm: SCBA/SA 2125 ppm: SA:CF* 4250 ppm: SCBAF/SAF/SAT:CF* 10,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz, drow, head, nau; irrit eyes, nose, throat; dry cracked skin	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical Attention immed		Skin, eyes, resp sys, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 50 ppm: CCROVDM/SA/SCBA 125 ppm: SA:CF/PAPROVDM 250 ppm: SCBAF/SAF/CCRFOVHiE/GMFOVHiE/PAPRTOVHiE §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/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: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed		Liver, kidneys, skin
Phenol						

7353

177

000184

Chemical name, structure/formula, CAS and RTECS Nos., and 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-Phenylene diamine $C_6H_4(NH_2)_2$ 106-50-3 SS8050000 1673 53	4-Amino aniline; 1,4-Benzenediamine; p-Diaminobenzene; 1,4-Diaminobenzene	NIOSH/OSHA 0.1 mg/m³ [skin]	Unknown	White to slightly red crystalline solid.	MW: 108.2 BP: 513°F Sol: 5% Fl.P: 312°F IP: 6.89 eV Combustible Solid	VP: <1 mm MLT: 295°F UEL: ? LEL: ?	Strong oxidizers	None available
Phenyl ether (vapor) $C_6H_5OC_6H_5$ 101-84-8 KN8970000	Diphenyl ether, Diphenyl oxide, Phenoxy benzene, Phenyl oxide 1 ppm = 7.08 mg/m³	NIOSH/OSHA 1 ppm (7 mg/m³)	N.E.	Colorless, crystalline solid or liquid (above 82°F) with a geranium-like odor.	MW: 170.2 BP: 498°F Sol: Insoluble Fl.P: 234°F IP: 8.09 eV Sp.Gr: 1.08 Class IIIB Combustible Liquid	VP(77°F): 0.02 mm MLT: 82°F UEL: 1.5% LEL: 0.8%	Strong oxidizers	Char; CS_2; GC/FID; II(2) [#S72]
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 = 6.90 mg/m³	NIOSH/OSHA 1 ppm (7 mg/m³)	N.E.	Colorless to straw-colored liquid or solid (below 54°F) with a disagreeable, aromatic odor. [Note: A mixture typically contains 75% phenyl ether & 25% biphenyl.]	MW: 166(approx) BP: 495°F Sol: Insoluble Fl.P(oc): 255°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; II(2) [#S73]
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 = 6.24 mg/m³	NIOSH Ca See Appendix A C 1 ppm (6 mg/m³) [15-min] OSHA 1 ppm (6 mg/m³)	Ca [Unknown]	Colorless liquid. [Note: A solid below 38°F.]	MW: 150.1 BP: 473°F Sol: 0.2% Fl.P: 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; II(2) [#S74]

000185

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 2.5 mg/m³: SA:CF[c] 5 mg/m³: SCBAF/SAF 25 mg/m³: 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
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 25 ppm: SA:CF[c]/PAPROVDM[c] 50 ppm: CCRFOVHIE/GMFOVHIE/SCBAF/SAF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Con Ing	Nau; irrit eyes, nose, skin	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 25 ppm: SA:CF[c]/PAPROVDM[c] 50 ppm: CCRFOVHIE/GMFOVHIE/SCBAF/SAF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Con Ing	Nau; irrit eyes, nose, skin	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Clothing: Any poss Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Skin irrit, sens; irrit eyes, upper resp sys; narco; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, eyes, CNS

Phenyl glycidyl ether

7353

000186

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Phenylhydrazine $C_6H_5NHNH_2$ 100-63-0 MW8925000 2572 53	Hydrazinobenzene, Monophenylhydrazine 1 ppm = 4.49 mg/m³	NIOSH Ca See Appendix A C 0.14 ppm (0.6 mg/m³) [2-hr] OSHA 5 ppm (20 mg/m³) ST 10 ppm (45 mg/m³) [skin]	Ca [295 ppm] ACGIH A2	Colorless to pale-yellow liquid or solid (below 67°F) with a faint, aromatic odor.	MW: 108.1 BP: 470°F (Decomposes) Sol: Slight Fl.P: 190°F IP: 7.64 eV Sp.Gr: 1.10 Class IIIA Combustible Liquid	VP(161°F): 1 mm FRZ: 67°F UEL: ? LEL: ?	Strong oxidizers, lead dioxide	Bub; Pho-acid; Vis; II(3) [#S160]
Phosdrin® $C_7H_{13}O_4PO_2$ 7786-34-7 GQ5250000 2783 55	2-Carbomethoxy-1-methylvinyl dimethyl phosphate, Mevinphos 1 ppm = 9.32 mg/m³	NIOSH/OSHA 0.01 ppm (0.1 mg/m³) ST 0.03 ppm (0.3 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 Fl.P(oc): 347°F IP: ? Sp.Gr: 1.25 Class IIIB Combustible Liquid	VP: 0.003 mm FRZ: -69°F UEL: ? LEL: ?	Strong oxidizers [Note: Corrosive to cast iron, some stainless steels, and brass.]	Chrom-102; Toluene; GC/FPD; III [#2503]
Phosgene $COCl_2$ 75-44-5 SY5600000 1076 15	Carbon oxychloride, Carbonyl chloride, Chloroformyl chloride 1 ppm = 4.11 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 Fl.P: NA IP: 11.55 eV Sp.Gr: 1.43 (Liquid at 32°F) Nonflammable Gas	VP: >1 atm FRZ: -198°F UEL: NA LEL: NA	Moisture [Note: Reacts slowly in water to form hydrochloric acid & carbon dioxide.]	Imp; Reagent; Vis; II(1) [P&CAM #219]
Phosphine PH_3 7803-51-2 SY7525000 2199 18	Hydrogen phosphide, Phosphorated hydrogen, Phosphorus hydride, Phosphorus trihydride 1 ppm = 1.41 mg/m³	NIOSH/OSHA 0.3 ppm (0.4 mg/m³) ST 1 ppm (1 mg/m³)	200 ppm	Colorless gas with a fish- or garlic-like odor. [pesticide] [Note: Shipped as a liquefied compressed gas. Pure compound is odorless.]	MW: 34.0 BP: -126°F Sol: Slight Fl.P: NA (Gas) IP: 9.96 eV Flammable Gas	VP: >1 atm FRZ: -209°F UEL: ? LEL: ?	Air, oxidizers, chlorine, acids, moisture, halogenated hydrocarbons, copper [Note: May ignite SPONTANEOUSLY on contact with air.]	Si gel; Reagent; Vis; II(5) [#S332]

000187

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed non-imperv contam 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
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 0.1 ppm: SA/SCBA 0.25 ppm: SA:CF 0.5 ppm: SCBAF/SAF/SAT:CF 4 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Miosis; rhin; head; tight chest, wheez, lar spasm, salv, cyan; anor, nau, vomit, abdom cramps, diarr; para; ataxia, convuls; low BP, card irregularities; irrit skin, eyes	Eye: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed		Resp sys, CNS, CVS, skin, blood chol
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 1 ppm: SA*/SCBA* 2 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes; dry burning throat; vomit; cough, foamy sputum, dysp, chest pain, cyan; skin burns	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, skin, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 3 ppm: SA/SCBA 7.5 ppm: SA:CF 15 ppm: SCBAF/SAF/GMFS 200 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Nau, vomit, abdom pain, diarr; thirst; chest pressure, dysp; musc pain; chills; stupor or syncope	Breath: Resp support		Resp sys
Phosphine						

7353
181
000188

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Phosphoric acid H_3PO_4 7664-38-2 TB6300000 1805 60	Metaphosphoric acid, Orthophosphoric acid, Phosphoric acid (aqueous), White phosphoric acid 1 ppm = 4.07 mg/m³	NIOSH/OSHA 1 mg/m³ ST 3 mg/m³	10,000 mg/m³	Thick, colorless, odorless, crystalline solid. [Note: Often used in an aqueous solution.]	MW: 98.0 BP: 415°F Sol: Miscible Fl.P: NA IP: ? Sp.Gr(77°F): 1.87 (Pure) 1.33 (50% soln) Noncombustible Liquid	VP: 0.03 mm MLT: 108°F UEL: NA LEL: NA	Strong caustics, most metals [Note: Readily reacts with metals to form flammable hydrogen gas.]	Si gel; $NaHCO_3$/Na_2CO_3; IC; III; [#7903: Inorganic Acids]
Phosphorus (yellow) P_4 7723-14-0 TH3500000 1381 38	Elemental white phosphorus, White phosphorus	NIOSH/OSHA 0.1 mg/m³	N.E.	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% Fl.P: ? IP: ? Sp.Gr: 1.82 Flammable Solid	VP: 0.03 mm MLT: 111°F UEL: ? LEL: ?	Air, oxidizers including elemental sulfur & strong caustics [Note: Ignites SPONTANEOUSLY in moist air.]	Tenax/CC; Xylene; GC/FPD III [#7905]
Phosphorus pentachloride PCl_5 10026-13-8 TB6125000 1806 39	Pentachlorophosphorus, Phosphoric chloride, Phosphorus perchloride	NIOSH/OSHA 1 mg/m³	200 mg/m³	White to pale-yellow, crystalline solid with a pungent, unpleasant odor.	MW: 208.3 BP: Sublimes Sol: Reacts Fl.P: NA IP: ? Noncombustible Solid	VP(132°F): 1 mm MLT: 324°F (Sublimes) UEL: NA LEL: NA	Water, magnesium oxide, chemically-active metals such as sodium & potassium, alkalis [Note: Hydrolyzes in water (even in humid air) to form hydrochloric acid and 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 41	Phosphorus persulfide, Phosphorus sulfide	NIOSH/OSHA 1 mg/m³ ST 3 mg/m³	750 mg/m³	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): 1 mm MLT: 550°F UEL: ? LEL: ?	Water, alcohols, strong oxidizers, acids [Note: Reacts with water to form hydrogen sulfide and sulfur dioxide.]	None available

000189

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss >1.6%/Repeat <1.6% Goggles: Any poss Wash: Immed contam Change: After work if reason prob contam sol Remove: Immed non-imperv contam Provide: >1.6%: Eyewash, quick drench	NIOSH/OSHA 25 mg/m³: SA:CF* 50 mg/m³: SCBAF/SAF/HIEF 2000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit upper resp tract, eyes, skin; burns skin, eyes; derm	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed contam Provide: Eyewash, quick drench	NIOSH/OSHA 1 mg/m³: SA 2.5 mg/m³: SA:CF‡ 5 mg/m³: SCBAF/SAF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Ing Con	Irrit eyes, resp tract; abdom pain, nau, jaun; anemia; cachexia; dental pain, excess salv, jaw pain, swell; burns skin, eyes	Eye: Skin: Breath: Resp support Swallow: Medical attention immed	Resp sys, liver, kidneys, jaw, teeth, blood, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work if reason prob contam Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 mg/m³: SA*/SCBA* 25 mg/m³: SA:CF* 50 mg/m³: SCBAF/SAF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, resp sys; bron; derm	Eye: Skin: Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 10 mg/m³: SA*/SCBA* 25 mg/m³: SA:CF* 50 mg/m³: SCBAF/SAF 750 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Apnea, coma, convuls; irrit eyes, conj pain, lac, photo, kerato-conj, corneal vesic; irrit resp sys; dizz; head; ftg; irrity, insom; GI dist	Eye: Irr immed Skin: Dust off solid; water flush Breath: Resp support Swallow: Medical attention immed	Resp sys, CNS, eyes, skin

Phosphorus pentasulfide

7353

000190

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Phosphorus trichloride PCl_3 7719-12-2 TH3675000 1809 39	Phosphorus chloride 1 ppm = 5.71 mg/m³	NIOSH/OSHA 0.2 ppm (1.5 mg/m³) ST 0.5 ppm (3 mg/m³)	50 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	VP(70°F): 100 mm FRZ: -170°F UEL: NA LEL: NA	Water, chemically-active metals such as sodium & potassium, aluminum, strong nitric acid, acetic acid, organic matter [Note: Hydrolyzes in water to form hydrochloric acid and phosphoric acid.]	Bub; Reagent; Vis; III [#6402]
Phthalic anhydride $C_6H_4(CO)_2O$ 85-44-9 TI3150000 2214 60	1,2-Benzenedicarboxylic anhydride; PAN; Phthalic acid anhydride	NIOSH/OSHA 6 mg/m³ (1 ppm)	10,000 mg/m³	White solid 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 Combustible Solid	VP(206°F): 1 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]
Picric acid $C_6H_2OH(NO_2)_3$ 88-89-1 TJ7875000 1344 33 (>10% water)	Phenol trinitrate; 2,4,6-Trinitrophenol 1 ppm = 9.52 mg/m³	NIOSH 0.1 mg/m³ ST 0.3 mg/m³ [skin] OSHA 0.1 mg/m³ [skin]	100 mg/m³	Yellow, odorless solid. [Note: Usually used as an aqueous solution.]	MW: 229.1 BP: Explodes above 572°F Sol: 1% Fl.P: 302°F IP: ? Sp.Gr: 1.76 Class IIIB Combustible Liquid	VP(383°F): 1 mm MLT: 252°F UEL: ? LEL: ?	Copper, lead, zinc & other metals; salts; plaster; concrete; ammonia [Note: Corrosive to metals. An explosive mixture results when the aqueous solution crystallizes.]	Filter; Methanol/Water; HPLC/UVD; II(4) [#S228]
Pindone $C_9H_5O_2C(O)C(CH_3)_3$ 83-26-1 NK6300000 2472 53	tert-Butyl valone; 1,3-Dioxo-2-pivaloy-lindane; Pival®; Pivalyl; 2-Pivalyl-1,3-indandione	NIOSH/OSHA 0.1 mg/m³	200 mg/m³	Bright yellow powder with almost no odor. [insecticide]	MW: 230.3 BP: Decomposes Sol(77°F): 0.002% Fl.P: ? IP: ? Sp.Gr: 1.06	VP: ? MLT: 230°F UEL: ? LEL: ?	None reported	None available

000191

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: SCBAF/SAF 50 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[4]/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; pulm edema; burns eyes, skin	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 30 mg/m³: DM* 60 mg/m³: DMXSQ*/SA*/SCBA* 150 mg/m³: SA:CF*/PAPRDM* 300 mg/m³: SCBAF/SAF/HIEF 10,000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Conj; nasal ulcer bleeding, upper resp irrit; bron, bronchial asthma; derm	Eye: Skin: Irr immed Breath: Soap wash prompt Swallow: Resp support Medical attention immed	Resp sys, eyes, skin, liver, kidneys
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA/SCBA 2.5 mg/m³: PAPRDM/SA:CF 5 mg/m³: HIEF/SCBAF/SAF/PAPRTHIE/SAT:CF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Con	Irrit eyes; sens derm; yellow-stain hair, skin; weak, myalgia, anuria, polyuria; bitter taste, GI dist; hepatitis, hematuria, album, neph	Eye: Skin: Irr immed Breath: Soap wash prompt Swallow: Resp support Medical attention immed	Kidneys, liver, blood, skin, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: After work if reason prob contam Remove: N.R.	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA/SCBA 2.5 mg/m³: PAPRDM/SA:CF 5 mg/m³: PAPRTHIE/SCBAF/SAF/HIEF/SAT:CF 200 mg/m : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Epis, excess bleeding from minor cuts, bruises; smoky urine, black tarry stools; pain abdom, back	Eye: Swallow: Irr immed Medical attention immed	Blood prothrombin

Pindone

7353

000192

185

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Platinum (soluble salts as Pt)	Synonyms vary depending upon the specific soluble salt.	NIOSH/OSHA 0.002 mg/m³	N.E.	Appearance and odor vary depending upon the specific soluble salt.	Properties vary depending upon the specific soluble salt.		None reported	Filter; Acid/ Reagent; HGA; II(7) [#S191]
Portland cement 65997-15-1 VV8770000	Cement, Hydraulic cement, Portland cement silicate	NIOSH/OSHA 10 mg/m³ (total) 5 mg/m³ (resp)	N.E.	Gray, odorless powder.	MW: ? BP: NA Sol: Insoluble Fl.P: NA IP: NA Noncombustible Solid	VP: 0 mm (approx) MLT: NA UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Propane $CH_3CH_2CH_3$ 74-98-6 TX2275000 1978 22	Bottled gas, Dimethyl methane, n-Propane, Propyl hydride 1 ppm = 1.83 mg/m³	NIOSH/OSHA 1000 ppm (1800 mg/m³)	20,000 ppm [LEL]	Colorless, odorless gas. [Note: A foul-smelling odorant is often added when used for fuel purposes. Shipped as a liquefied compressed gas.]	MW: 44.1 BP: -44°F Sol: 0.01% Fl.P: NA (Gas) IP: 11.07 eV Flammable Gas	VP: >1 atm FRZ: -306°F UEL: 9.5% LEL: 2.1%	Strong oxidizers	Combustible gas meter; none; none; II(2) [#S87]
beta-Propiolactone $C_3H_4O_2$ 57-57-8 RQ7350000	BPL; Hydroacrylic acid, beta lactone; 3-Hydroxy-beta-lactone; 3-Hydroxy-propionic acid; beta-Lactone; 2-Oxetanone; 3-Propiolacetone 1 ppm = 3.00 mg/m³.	NIOSH Ca See Appendix A OSHA [1910.1013] See Appendix B ACGIH 0.5 ppm, A2 (1.5 mg/m³)	Ca	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

186

000193

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 0.05 mg/m³: SA:CF[£] 0.1 mg/m³: HiEF/SCBAF/SAF 4 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Irrit eyes, nose; cough, dysp, wheez, cyan; skin sens; lymphocytosis Ing Con	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: D 100 mg/m³: SA/SCBA/DXSQ 250 mg/m³: PAPRD/SA:CF 500 mg/m³: SCBAF/SAF/HiEF/SAT:CF/PAPRTHIE 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Irrit eyes, nose; cough, expectoration; exertional dyspn, wheez, chronic bron; derm Con Ing	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Fresh air Medical attention immed	Resp sys, eyes, skin
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 10,000 ppm: SA/SCBA 20,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Dizz, disorientation, excitation, frostbite Con	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	CNS
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Skin irrit, blistering, burns; corneal opac; frequent urination; dysuria; hema; [carc] Abs Ing Con	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Kidney, skin, lungs, eyes

7353

187

000194

7353

Chemical name, structure/formula, CAS and RTECS Nos., and 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-Propyl acetate $CH_3COOCH_2CH_2CH_3$ 109-60-4 AJ3675000 1276 26	Propylacetate, n-Propyl ester of acetic acid 1 ppm = 4.25 mg/m³	NIOSH/OSHA 200 ppm (840 mg/m³) ST 250 ppm (1050 mg/m³)	8000 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(84°F): 40 mm FRZ: -134°F UEL: 8% LEL(100°F): 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; III [#1450, Esters I]
n-Propyl alcohol $CH_3CH_2CH_2OH$ 71-23-8 UH8225000 1274 26	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol 1 ppm = 2.50 mg/m³	NIOSH 200 ppm (500 mg/m³) ST 250 ppm (625 mg/m³) [skin] OSHA 200 ppm (500 mg/m³) ST 250 ppm (625 mg/m³)	4000 ppm	Colorless liquid with a mild, alcohol-like odor.	MW: 60.1 BP: 207°F Sol: Miscible Fl.P: 72°F IP: 10.15 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP(77°F): 21 mm FRZ: -196°F UEL: 13.7% LEL: 2.2%	Strong oxidizers	Char; 2-Propanol/CS_2; GC/FID; III [#1401, Alcohols II]
Propylene dichloride $CH_3CHClCH_2Cl$ 78-87-5 TX9625000 1279 27	Dichloro-1,2-propane; 1,2-Dichloropropane 1 ppm = 4.70 mg/m³	NIOSH Ca See Appendix A OSHA 75 ppm (350 mg/m³) ST 110 ppm (510 mg/m³)	Ca [2000 ppm]	Colorless liquid with a chloroform-like odor. [pesticide]	MW: 113.0 BP: 206°F Sol: 0.3% Fl.P: 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	Char(pet); Acetone/Cyclohexane; GC/ECD; III [#1013, 1,2-Dichloropropane]
Propylene imine C_3H_7N 75-55-8 CM8050000 1921 30 (inhibited)	2-Methylaziridine, 2-Methylethyleneimine, Propyleneimine, Propylene imine (inhibited) Propylenimine 1 ppm = 2.37 mg/m³	NIOSH Ca See Appendix A 2 ppm (5 mg/m³) [skin] OSHA 2 ppm (5 mg/m³) [skin]	Ca [500 ppm] ACGIH A2	Colorless, oily liquid with an ammonia-like odor.	MW: 57.1 BP: 152°F Sol: Miscible Fl.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

000195

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCRFOV 5000 ppm: SA:CF* 8000 ppm: GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose, throat; narco; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support	Resp sys, eyes, skin, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV*/CCROV* 2000 ppm: SA*/SCBA* 4000 ppm: SA:CF*/SCBAF/SAF/GMFOV §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Mild irrit eyes, nose, throat; dry cracking skin; drow, head; ataxia, GI pain; abdom cramps: nau, vomit, diarr	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed	Skin, eyes, resp sys, GI tract
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Eye irrit; drow, li-head; irrit skin; [carc]; in animals: liver, kidney disease; skin irrit	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, eyes, resp sys, liver, kidneys
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	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
Propylene imine					

7353

000196

189

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Propylene oxide C_3H_6O 75-56-9 TZ2975000 1280 26 (inhibited)	1,2-Epoxy propane; Methyl ethylene oxide; Methyloxirane; Propene oxide; 1,2-Propylene oxide 1 ppm = 2.42 mg/m³	NIOSH Ca See Appendix A OSHA 20 ppm (50 mg/m³)	Ca [2000 ppm]	Colorless liquid with a benzene-like odor. [Note: A gas above 94°F.]	MW: 58.1 BP: 94°F Sol: 41% Fl.P: -35°F IP: 9.81 eV 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; III [#1612]
n-Propyl nitrate $CH_3CH_2CH_2NO_3$ 627-13-4 UK0350000 1865 30	Propyl ester of nitric acid 1 ppm = 4.37 mg/m³	NIOSH/OSHA 25 ppm (105 mg/m³) ST 40 ppm (170 mg/m³)	2000 ppm	Colorless to straw-colored liquid with an ether-like odor.	MW: 105.1 BP: 231°F Sol: Insoluble Fl.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	Char; CS_2; GC/FID; II(3) [#S227]
Pyrethrum $C_{20}H_{28}O_3$ $C_{21}H_{28}O_3$ $C_{22}H_{28}O_5$ 8003-34-7 UR4200000 9184 31	Cinerin I or II, Jasmolin I or II, Pyrethrin I or II, Pyrethrum I or II	NIOSH/OSHA 5 mg/m³	5000 mg/m³	Brown, viscous oil or solid. [insecticide preparations containing pyrethrins]	MW: 316-372 BP: ? Sol: Insoluble Fl.P: 180 to 190°F IP: ? Class IIIA Combustible Liquid	VP: Low MLT: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH_3CN; HPLC/UVD; III [#5008]
Pyridine C_5H_5N 110-86-1 UR8400000 1282 26	Azabenzene, Azine 1 ppm = 3.29 mg/m³	NIOSH/OSHA 5 ppm (15 mg/m³)	3600 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(77°F): 20 mm FRZ: -44°F UEL: 12.4% LEL: 1.8%	Strong oxidizers, strong acids	Char; CH_2Cl_2; GC/FID; III [#1613]

000197

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con Ing	Irrit eyes, upper resp sys, lungs; skin irrit, blister, burns; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed non-imperv contam	NIOSH/OSHA 250 ppm: SA/SCBA 625 ppm: SA:CF 1250 ppm: SCBAF/SAF/SAT:CF 2000 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	In animals: methemoglobin, anoxia, cyan; dysp, weak, dizz, head; irrit eyes, skin	Eye: Skin: Irr immed Breath: Soap wash prompt Swallow: Resp support Medical attention immed	None known
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: CCROVDMFu*/SA*/SCBA* 125 mg/m³: SA:CF*/PAPROVDMFu* 250 mg/m³: CCRFOVHIE/SCBAF/SAF/PAPRTOVHIE* 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Erythema, derm, papules, pruritus, rhin; sneezing; asthma	Eye: Skin: Irr immed Breath: Soap wash immed Swallow: Resp support Medical attention immed	Resp sys, skin, CNS
Clothing: Reason prob Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed wet (flamm) Provide: Eyewash, quick drench	NIOSH/OSHA 125 ppm: SA:CF*/PAPROV* 250 ppm: CCRFOV/GMFOV/SCBAF/SAF 3500 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, ner, dizz, insomnia; nau, anor; urine frequent; eye irrit; derm; liver, kidney damage	Eye: Skin: Irr immed Breath: Water flush immed Swallow: Resp support Medical attention immed	CNS, liver, kidneys, skin, GI tract

Pyridine

7353

191

000198

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Quinone $C_6H_4O_2$ 106-51-4 DK2625000 2587 55	1,4-Benzoquinone; p-Benzoquinone; 1,4-Cyclohexadiene dioxide; p-Quinone	NIOSH/OSHA 0.4 mg/m³ (0.1 ppm)	300 mg/m³	Pale-yellow solid with an acrid, chlorine-like odor.	MW: 108.1 BP: Sublimes Sol: Slight Fl.P: 100 to 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]
Rhodium (metal fume and insoluble compounds as Rh) Rh 7440-16-6 (Metal) VI9355000 (Metal)	Metal: Elemental rhodium Synonyms of other insoluble compounds vary depending upon the specific compound.	NIOSH/OSHA 0.1 mg/m³	N.E.	Metal: White, hard, ductile, malleable solid with a bluish-gray luster.	MW: 102.9 BP: 6741°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 12.41 (Metal) Metal: Noncombustible Solid, but flammable in form of dust or powder.	VP: 0 mm (approx) MLT: 3571°F UEL: NA LEL: NA	None reported	Filter; Acid; AA; II(3) [#S188]
Rhodium (soluble compounds as Rh)	Synonyms vary depending upon the specific soluble compound.	NIOSH/OSHA 0.001 mg/m³	N.E.	Appearance and odor vary depending upon the specific soluble compound.	Properties vary depending upon the specific soluble compound.		None reported	Filter; Acid; HGA; 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/OSHA 10 mg/m³	5000 mg/m³	White to light tan, crystalline solid. [insecticide] [Note: A liquid above 95°F.]	MW: 321.6 BP: Decomposes Sol(77°F): 0.004% Fl.P: NA IP: ? Sp.Gr(77°F): 1.49 Noncombustible Solid	VP(77°F): 0.0008 mm MLT: 106°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Chromosorb 102; Toluene; GC/FID; II(6) [#S299]

000199

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	Reason prob Any poss Immed contam After work if any poss *contam* Immed non-imperv contam Eyewash, quick drench	NIOSH/OSHA 10 mg/m³: SA/CF[t] 20 mg/m³: SCBAF/SAF 300 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: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin
Clothing: Goggles: Wash: Change: Remove:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 0.5 mg/m³: DM[^] 1 *mg/m³: SA/SCBA/DMXSQ[^]* 2.5 mg/m³: PAPRDMFu/SA:CF 5 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE/SAT:CF 100 mg/m³: SA:PD,PP 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	None known	Breath: Swallow:	Resp support Medical attention immed	None known
Clothing: Goggles: Wash: Change: Remove:	*Repeat* Reason prob Prompt contam N.R. Prompt non-imperv *contam*	*NIOSH/OSHA* 0.01 mg/m³: HiE*/SA*/SCBA* 0.025 mg/m³: PAPRHiE*/SA:CF* 0.05 mg/m³: PAPRTHiE*/HiEF/SCBAF/SAF 2 mg/m³: *SAF:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	In animals: mild eye irrit; CNS damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush Art Resp Medical attention immed	Eyes
Clothing: Goggles: Wash: *Change:* Remove:	*Repeat* Reason prob Promptly contam *After work if reason* prob contam Prompt non-imperv contam	NIOSH/OSHA 100 mg/m³: CCROVDMFu/SA/SCBA 250 mg/m³: SA:CF/PAPROVDMFu 500 mg/m³: *SCBAF/SAF/CCRFOVHiE/*GMFOVHiE/PAPRTOVHiE* 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	In animals: Chol inhibition; eye irrit; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, liver, kidneys, blood plasma

Ronnel

7353

193

000200

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Rotenone $C_{23}H_{22}O_6$ 83-79-4 DJ2800000	1,2,12,12a-Tetrahydro-8,9-dimethoxy-2-(1-methyl-ethenyl)-(1)benzopyrano [3,4-b]furo(2,3-h)[1] benzopyran-6(6aH)-one	NIOSH/OSHA 5 mg/m³	Unknown	Colorless to red, odorless, crystalline solid. [insecticide]	MW: 394.4 BP: Decomposes Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.27 Combustible Solid	VP: Low MLT: 330°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; CH_3CN; HPLC/UV; III [#5007]
Selenium compounds (as Se) Se 7782-49-2 (element) VS7700000 (element) 2658 53 (powder) 2657 53 (disulfide)	Element: Elemental selenium, Selenium alloy Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 0.2 mg/m³	Unknown	Element: Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.]	MW: 79.0 BP: 1265°F Sol: Insoluble Fl.P: ? IP: NA Sp.Gr: 4.28 Combustible Solid	VP: 0 mm (approx) MLT: 392°F UEL: ? LEL: ?	Acids, strong oxidizers, chromium trioxide, potassium bromate	Filter; Acid; AA; II(7) [#S190]
Selenium hexafluoride (as Se) SeF_6 7783-79-1 VS9450000 2194 15	Selenium fluoride 1 ppm = 8.02 mg/m³	NIOSH/OSHA 0.05 ppm (0.4 mg/m³)	5 ppm	Colorless gas.	MW: 193.0 BP: -30°F Sol: Insoluble Fl.P: NA IP: ? 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, Silica gel, Silicon dioxide (amorphous)	NIOSH See Appendix D OSHA 6 mg/m³ See Appendix C	N.E.	Transparent to gray, odorless powder. [Note: Amorphous silica is the non-crystalline form of SiO_2.]	MW: 60.1 BP: 4046°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.20 Noncombustible Solid	VP: 0 mm (approx) MLT: 3110°F UEL: NA LEL: NA	Fluorine, oxygen difluoride, chlorine trifluoride	Filter; LTA; XRD; III [#7501]

7353
194
000201

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if any poss contam Remove: Prompt non-imperv contam	NIOSH/OSHA 5 mg/m³: CCROVDMFu/SA/SCBA 125 mg/m³: SA:CF/PAPROVDMFu 250 mg/m³: SCBAF/SAF/CCRFOVHiE/GMFOVHiE/SAT:CF/PAPRTOVHiE 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit eyes; numb muc memb; nau, vomit, abdom pain; musc tremor, inco, clonic convuls, stupor; pulm irrit; skin irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	CNS, eyes, resp sys
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 2 mg/m³: DMF^/SA*/SCBA* 5 mg/m³: PAPRDM^*/SA:CF* 10 mg/m³: HiEF/SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; vis dist; head; chills, fever; dysp, bron; metallic taste, garlic breath, GI dist; derm; skin, eye burns; in animals: anemia; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Upper resp sys, eyes, skin, liver, kidneys, blood
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA:CF 2.5 ppm: SCBAF/SAF/SAT:CF 5 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	In animals: pulm irrit, edema	Breath:	Resp support	None known in humans
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	OSHA 30 mg/m³: DM 60 mg/m³: DMXSQ/SA/SCBA 150 mg/m³: PAPRDM/SA:CF 300 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 3000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Pneumoconiosis	Eye:	Irr immed	Resp sys
Silica, amorphous						

7353

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7353

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Silica, crystalline (as respirable dust) SiO_2 14808-60-7 VV7330000	Cristobalite, Quartz, Tridymite, Tripoli	NIOSH Ca See Appendix A 0.05 mg/m³ OSHA 0.05 mg/m³ (cristobalite) 0.05 mg/m³ (tridymite) 0.1 mg/m³ (quartz) 0.1 mg/m³ (tripoli)	Ca [N.E.]	Colorless, odorless solid. [Note: A component of many mineral dusts.]	MW: 60.1 BP: 4046°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.66 Noncombustible Solid	VP: 0 mm (approx) MLT: 3110°F UEL: NA LEL: NA	Powerful oxidizers: fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, hydrogen peroxide, etc.; acetylene; ammonia	Filter; LTA; XRD; III [#7500]
Silver (metal dust and soluble compounds as Ag) Ag 7440-22-4 (Metal) VW3500000 (Metal)	Metal: Silver metal Synonyms of soluble compounds vary depending upon the specific compound.	NIOSH/OSHA 0.01 mg/m³	N.E.	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; III [#7300, Elements]
Soapstone (containing less than 1% quartz) $3MgO\text{-}4SiO_2\text{-}H_2O$ VV8780000	Massive talc, Soapstone silicate, Steatite	NIOSH/OSHA 6 mg/m³ (total) 3 mg/m³ (resp)	N.E.	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; III [#0500, Nuisance Dust (total)]
Sodium fluoroacetate $FCH_2C(O)ONa$ 62-74-8 AH9100000	SFA, Sodium monofluoroacetate	NIOSH/OSHA 0.05 mg/m³ ST 0.15 mg/m³ [skin]	5 mg/m³	Fluffy, colorless to white (sometimes dyed black), odorless powder. [Note: A liquid above 95°F.] [rodenticide]	MW: 100.0 BP: 332°F Sol: Miscible Fl.P: NA IP: ? Noncombustible Solid	VP: Low MLT: 95°F UEL: NA LEL: NA	None reported	Filter; Water; IC; II(5) [#S301]

196

000203

2629 53

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Cough, dysp, wheez; impaired pulm func, progressive symptoms; [carc]	Eye: Breath:	Irr immed Fresh air	Resp sys
Clothing: Reason prob Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH/OSHA 0.25 mg/m³: SA:CF[£]/PAPRHiE[£] 0.5 mg/m³: HiEF/SCBAF/SAF 20 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 skin, ulceration; GI dist	Eye: Skin: Breath: Swallow:	Irr immed Water flush Resp support Medical attention immed	Nasal septum, skin, eyes
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 30 mg/m³: DM 60 mg/m³: DMXSQ/SA/SCBA 150 mg/m³: PAPRDM/SA/SCBA 300 mg/m³: HiEF/SCBAF/SAF/PAPRTHiE*/SAT:CF* 3000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Cough, dysp; digital clubbing; cyan; basal crackles, cor pulmonale	Eye: Breath:	Irr immed Resp support	Lungs, CVS
Clothing: Any poss Goggles: Reason prob Wash: Immed contam Change: After work if any poss contam Remove: Immed non-imperv contam Provide: Quick drench	NIOSH/OSHA 0.25 mg/m³: DM 0.5 mg/m³: DMXSQ/SA/SCBA 1.25 mg/m³: PAPRDM/SA:CF 2.5 mg/m³: PAPRTHiE/SCBAF/SAF HiEF/SAT:CF 5 mg/m³: SA:PD,PP §: 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, tacard, venfib; pulm edema; nystagmus; convuls	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CVS, lungs, kidneys, CNS

Sodium fluoroacetate

7353

000204

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Sodium hydroxide NaOH 1310-73-2 WB4900000 1823 60 (solid) 1824 60 (soln)	Caustic soda, Lye, Soda lye, Sodium hydrate	NIOSH/OSHA C 2 mg/m³	250 mg/m³	Colorless to white, odorless solid (flakes, beads, granular form).	MW: 40.0 BP: 2534°F Sol: 111% Fl.P: NA IP: NA Sp.Gr: 2.13 Noncombustible Solid, but when in contact with water may generate sufficient heat to ignite combustible materials.	VP: 0 mm (approx) MLT: 605°F UEL: NA LEL: NA	Water; acids; flammable liquids; organic halogens; metals such as aluminum, tin & zinc; nitromethane [Note: Corrosive to metals.]	Filter; HCl; Titrate; III [#7401, Alkaline Dusts]
Stibine SbH_3 7803-52-3 WJ0700000 2676 18	Antimony hydride, Antimony trihydride, Hydrogen antimonide 1 ppm = 5.19 mg/m³	NIOSH/OSHA 0.1 ppm (0.5 mg/m³)	40 ppm	Colorless gas with a disagreeable odor like hydrogen sulfide.	MW: 124.8 BP: -1°F Sol: Slight Fl.P: NA (Gas) IP: 9.51 eV Flammable Gas	VP: >1 atm FRZ: -126°F UEL: ? LEL: ?	Acids, halogenated hydrocarbons, oxidizers, moisture, chlorine, ozone, ammonia	Si gel*; HCl; Vis; III [#6008]
Stoddard solvent 8052-41-3 WJ8925000 1268 27 (petroleum distillate)	Dry cleaning safety solvent, Mineral spirits, Petroleum solvent, Spotting naphtha	NIOSH 350 mg/m³ C 1800 mg/m³ [15-min] OSHA 100 ppm (525 mg/m³)	29,500 mg/m³	Colorless liquid with a kerosene-like odor.	MW: Varies BP: 428-572°F Sol: Insoluble Fl.P: 110°F IP: ? Sp.Gr: 0.78 Class II Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; III [#1550]
Strychnine $C_{21}H_{22}N_2O_2$ 57-24-9 WL2275000 1692 53	None	NIOSH/OSHA 0.15 mg/m³	3 mg/m³	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; III [#5016]

000205

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — *maximum* concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: After work *if reason prob contam* *Remove:* Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 50 mg/m³: PAPRDM[£]/SA:CF[£] 100 mg/m³: SCBAF/SAF/HiEF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit nose; pneuitis; burns eyes, skin; temporary loss of hair	*Eye:* Irr immed Skin: Water flush immed *Breath:* Resp support Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 1 ppm: SA/SCBA 2.5 ppm: SA:CF 5 ppm: SCBAF/SAF/SAT:CF 40 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head, weak; nau, abdom *pain; lumbar pain, hemog, hema, hemolytic anemia;* jaun; irrit lung	*Breath:*	Resp support	Blood, liver kidneys, lungs
Clothing: Repeat Goggles: *Reason prob* Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH 3500 mg/m³: SA*/SCBA*/CCROV* 5900 mg/m³: PAPROV*/CCRFOV 8750 mg/m³: SA:CF* 17,500 mg/m³: GMFOV/SCBAF/SAF 29,500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	*Inh* Con Ing	*Irrit eyes, nose, throat;* dizz; derm	Eye: *Skin:* Breath: *Swallow:*	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, eyes, resp sys, CNS
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: *After work if any poss contam* Remove: N.R.	NIOSH/OSHA 0.75 mg/m³: DM 1.5 mg/m³: DMXSQ/SA/SCBA 3 mg/m³: PAPRDM/SA:CF/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: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	CNS

Strychnine

7353

000206

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Styrene $C_6H_5CH{=}CH_2$ 100-42-5 WL3675000 2055 27 (inhibited)	Ethenyl benzene, Phenylethylene, Styrene monomer, Styrol, Vinyl benzene 1 ppm = 4.33 mg/m³	NIOSH/OSHA 50 ppm (215 mg/m³) ST 100 ppm (425 mg/m³)	5000 ppm	Colorless to yellow, oily liquid with a sweet, floral odor.	MW: 104.2 BP: 293°F Sol: Slight Fl.P: 88°F IP: 8.40 eV Sp.Gr: 0.91 Class IC Flammable Liquid	VP: 5 mm FRZ: -23°F UEL: 7.0% LEL: 1.1%	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; III [#1501, Aromatic Hydrocarbons]
Sulfur dioxide SO_2 7446-09-5 WS4550000 1079 16	Sulfurous acid anhydride, Sulfurous oxide, Sulfur oxide 1 ppm = 2.66 mg/m³	NIOSH/OSHA 2 ppm (5 mg/m³) ST 5 ppm (10 mg/m³)	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 Nonflammable Gas	VP: >1 atm FRZ: -104°F UEL: NA LEL: NA	Powdered and alkali metals such as sodium & potassium, water, ammonia, aluminum [Note: Reacts with water to form sulfuric acid.]	Filters(2); $NaHCO_3$/Na_2CO_3; IC; III [#6004]
Sulfuric acid H_2SO_4 7664-93-9 WS5600000 1830 39 (51-95% acid) 1831 39 (fuming) 1832 39 (spent)	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous) 1 ppm = 4.08 mg/m³	NIOSH/OSHA 1 mg/m³	80 mg/m³	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(295°F): 1 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; III [#7903, Inorganic Acids]
Sulfur monochloride S_2Cl_2 10025-67-9 WS4300000 1828 39	Sulfur chloride, Sulfur subchloride, Thiosulfurous dichloride 1 ppm = 5.61 mg/m³	NIOSH/OSHA C 1 ppm (6 mg/m³)	10 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: 1.66 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

000207

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: CCRFOV/PAPROV* 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; drow, weak, unsteady gait; narco; defatting derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush Resp support Medical attention immed	CNS, resp sys, eyes, skin
Clothing: Prevent skin freezing Goggles: Any poss Wash: N.R. Change: N.R. Remove: Immed wet Provide: Eyewash	NIOSH/OSHA 20 ppm: CCRS*/SA*/SCBA* 50 ppm: PAPRS*/SA:CF* 100 ppm: CCRFS/GMFS/PAPRTS*/SCBAF/SAF/SAT:CF* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, throat, rhin; choking, cough; reflex bronchoconstriction; eye, skin burns	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	Resp sys, skin, eyes
Clothing: Any poss >1%/Repeat <1% Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: >1%: Eyewash, quick drench	NIOSH/OSHA 25 mg/m³: PAPRAGHiE*/SA:CF* 50 mg/m³: CCRFAGHiE/SCBAF/SAF/GMFAGHiE 80 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAGHiE/SCBAE	Inh Ing Con	Eye, nose, throat irrit; pulm edema, bron; emphy; conj; stomatis; dental erosion; trachbronc; skin, eye burns; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, eyes, skin, teeth
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 10 ppm: PAPRS*/CCRFS/GMFS/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con Ing	Lac; cough; burn eyes, skin; pulm edema	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, skin, eyes

Sulfur monochloride

7353

000208

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Sulfur pentafluoride S_2F_{10} 5714-22-7 WS4480000	Disulfur decafluoride, Sulfur decafluoride	NIOSH/OSHA C 0.01 ppm (0.1 mg/m³)	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: ?	VP: 561 mm FRZ: -134°F UEL: NA LEL: NA	None reported	None available
	1 ppm = 10.56 mg/m³				Sp.Gr(32°F): 2.08 Noncombustible Liquid			
Sulfuryl fluoride SO_2F_2 2699-79-8 WT5075000	Sulfur difluoride dioxide	NIOSH/OSHA 5 ppm (20 mg/m³) ST 10 ppm (40 mg/m³)	1000 ppm	Colorless, odorless gas. [Note: Shipped as a liquefied compressed gas.] [insecticide/ fumigant]	MW: 102.1 BP: -68°F Sol(32°): 0.2% Fl.P: NA IP: 13.04 eV	VP: >1 atm FRZ: -212°F UEL: NA LEL: NA	None reported	None available
2191 15	1 ppm = 4.24 mg/m³				Nonflammable Gas			
2,4,5-T $C_6H_2Cl_3OCH_2COOH$ 93-76-5 AJ8400000	2,4,5-Trichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m³	Unknown	Colorless to tan, odorless, crystalline solid. [herbicide]	MW: 255.5 BP: Decomposes Sol: 0.03% Fl.P: ? IP: ?	VP: Low MLT: 307°F UEL: ? LEL: ?	None reported	Filter; Methanol; HPLC/UVD; III [#5001]
2765 55					Sp.Gr: 1.80 Combustible Solid, but burns with difficulty.			
Talc (containing no asbestos and less than 1% quartz) $Mg_3H_2(SiO_3)_4$ 14807-96-6 WW2710000	Hydrous magnesium silicate, Steatite talc	NIOSH/OSHA 2 mg/m³ (resp)	N.E.	Odorless, white powder.	MW: Varies BP: ? Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1652 to 1832°F UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0600; Nuisance Dust; (resp)]
					Sp.Gr: 2.70-2.80 Noncombustible Solid			

202

000209

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: N.R. Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 0.1 ppm: SA/SCBA 0.25 ppm: SA:CF 0.5 ppm: SCBAF/SAF/SAT:CF 1 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	Ing Con	In animals: pulm edema, hemorr	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, CNS
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 50 ppm: SA*/SCBA* 125 ppm: SA:CF* 250 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFS/SCBAE	Inh Con	Conj, rhin, phar; pares; in animals: narco, tremor, convuls; pulm edema; kidney inj	Eye: Breath: Resp support	Resp sys, CNS
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 50 mg/m³: DM 100 mg/m³: DMXSQ/SA/SCBA 250 mg/m³: SA:CF/PAPRDM 500 mg/m³: HIEF/SCBAF/SAF/PAPRTHIE/SAT:CF 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: ataxia; skin irrit, acne-like rash	Eye: Skin: Irr immed, Soap wash Breath: Resp support Swallow: Medical attention immed	Skin, liver, GI tract
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 10 mg/m³: DM 20 mg/m³: DMXSQ/SA/SCBA 50 mg/m³: PAPRDM/SA:CF 100 mg/m³: HIEF/PAPRTHIE/SAT:CF SCBAF/SAF 1000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Fibriotic pneumoconiosis	Eye: Irr immed	Lungs, CVS

Talc (containing no asbestos and less than 1% quartz)

7353

000210

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Tantalum (metal and oxide dust as Ta) Ta 7440-25-7 (Metal) WW5505000 (Metal)	Metal: Tantalum-181 Synonyms of other compounds vary depending upon the specific compound.	NIOSH 5 mg/m³ ST 10 mg/m³ OSHA 5 mg/m³	N.E.	Metal: Steel-blue to gray solid or black powder.	MW: 180.9 BP: 9797°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 16.65 (Metal) 14.40 (Powder) Noncombustible Solid in bulk form, but powder ignites SPONTANEOUSLY in air.	VP: 0 mm (approx) MLT: 5425°F UEL: NA LEL: NA	Strong oxidizers, bromine trifluoride, fluorine	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
TEDP $(C_2H_5)_4P_2S_2O_5$ 3689-24-5 XN4375000 1704 55	Dithion, Sulfotepp, Tetraethyl dithiono-pyrophosphate, Tetraethyl dithiopyro-phosphate 1 ppm = 13.40 mg/m³	NIOSH/OSHA 0.2 mg/m³ [skin]	35 mg/m³	Pale-yellow liquid with a garlic-like odor. [Note: A pesticide that may be absorbed on a solid carrier or mixed in a more flammable liquid.]	MW: 322.3 BP: Decomposes Sol: 0.0007% 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 and compounds (as Te) Te 13494-80-9 (Metal) WY2625000 (Metal)	Metal: Aurum paradoxum, Metallum problematum Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 0.1 mg/m³	N.E.	Metal: Odorless, dark-gray to brown, amorphous powder or grayish-white, brittle solid.	MW: 127.6 BP: 1814°F Sol: Insoluble Fl.P: ? IP: NA Sp.Gr: 6.24 Combustible Solid	VP: 0 mm (approx) MLT: 842°F UEL: ? LEL: ?	Oxidizers, chlorine	Filter; Acid; AA; II(3) [#S204]
Tellurium hexafluoride (as Te) TeF_6 7783-80-4 WY2800000 2195 15	Tellurium fluoride 1 ppm = 10.04 mg/m³	NIOSH/OSHA 0.02 ppm (0.2 mg/m³)	1 ppm	Colorless gas with a repulsive odor.	MW: 241.6 BP: Sublimes Sol: Decomposes Fl.P: NA IP: ? Nonflammable Gas	VP: >1 atm FRZ: -36°F (Sublimes) UEL: NA LEL: NA	Water [Note: Hydrolyzes slowly in water to telluric acid.]	Char; NaOH; AA; II(3) [#S187]

000211

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 25 mg/m³: DM^ 50 mg/m³: DMXSQ^/DMFu/SA/SCBA 125 mg/m³: PAPRDM^/SA:CF 250 mg/m³: HIEF/PAPRTHIE/SAT:CF SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	In animals: pulm irrit	Breath: Resp support	None known in humans
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 2 mg/m³: SA/SCBA 5 mg/m³: SA:CF 10 mg/m³: SCBAF/SAF 35 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Eye pain, blurred vision, lac, rhin; head; cyan; anor, nau, vomit, diarr; local sweat, weak, twitch, para, Cheyne-Stokes resp, convuls, low BP, card irregularities; skin, eye irrit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	CNS, resp sys, CVS
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 0.5 mg/m³: DM^ 1 mg/m³: SA/SCBA/DMXSQ^/DMFu 2.5 mg/m³: PAPRDM^/SA:CF 5 mg/m³: PAPRTHIE/SCBAF/SAF/SAT:CF/HIEF 50 mg/m3: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Garlic odor on breath, sweat; dry mouth, metal taste; som; anor, nau, no sweat; derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, CNS
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 0.2 ppm: SA/SCBA 0.5 ppm: SA:CF 1 ppm: SCBAF/SAF/SAT:CF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head; dysp; garlic odor on breath; in animals: pulm edema	Breath: Resp support	Resp sys

Tellurium hexafluoride (as Te)

7353

000212

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
TEPP $(C_2H_5)_4P_2O_7$ 107-49-3 UX6825000	Ethyl pyrophosphate, Tetraethyl pyrophosphate	NIOSH/OSHA 0.05 mg/m³ [skin]	10 mg/m³	Colorless to amber liquid with a faint, fruity odor. [Note: A solid below 32°F.] [insecticide]	MW: 290.2 BP: Decomposes Sol: Miscible Fl.P: NA IP: ?	VP(86°F): 0.0005 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; III [⌀2504, Tetraethyl Pyrophosphate]
2783 55 (dry)	1 ppm = 12.06 mg/m³				Sp.Gr: 1.19 Noncombustible Liquid			
Terphenyls $C_6H_5C_6H_4C_6H_5$ 26140-60-3 WZ6450000	Diphenylbenzenes; Phenyl biphenyls; ortho-, meta-, or para-Terphenyl	NIOSH/OSHA C 5 mg/m³ (0.5 ppm)	Unknown	Colorless or light-yellow solid. [Note: Consists of 3 different isomers.]	MW: 230.3 BP: 630-761°F Sol: Insoluble Fl.P(oc): 325 to 405°F IP: 7.99 eV(o) 8.01 eV(m) 7.78 eV(p) Sp.Gr: 1.10-1.23 Combustible Solid	VP: ? MLT: 136 to 415°F UEL: ? LEL: ?	None reported	Filter; CS_2; GC/FID; III [⌀5021]
1,1,2,2-Tetrachloro-1,2-difluoroethane CCl_2FCCl_2F 76-12-0 KI1420000	1,2-Difluoro-1,1,2,2-tetrachloroethane; Freon® 112; Halocarbon 112; Refrigerant 112	NIOSH/OSHA 500 ppm (4170 mg/m³)	15,000 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% Fl.P: NA IP: 11.30 eV	VP: 40 mm MLT: 77°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium & sodium; acids	Char; CS_2; GC/FID; III [⌀1016]
1078 12 (refrigerant)	1 ppm = 8.47 mg/m³				Sp.Gr: 1.65 Noncombustible Solid			
1,1,1,2-Tetrachloro-2,2-difluoroethane CCl_3CClF_2 76-11-9 KI1425000	2,2-Difluoro-1,1,1,2-tetrachloroethane; Freon® 112a; Halocarbon 112a; Refrigerant 112a	NIOSH/OSHA 500 ppm (4170 mg/m³)	15,000 ppm	Colorless solid with a slight, ether-like odor. [Note: A liquid above 105°F.]	MW: 203.8 BP: 197°F Sol: 0.01% Fl.P: NA IP: ?	VP: ? MLT: 105°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium & sodium; acids	Char; CS_2; GC/FID; III [⌀1016]
	1 ppm = 8.47 mg/m³				Noncombustible Solid			

000213

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH/OSHA 0.5 mg/m³: SA/SCBA 1.25 mg/m³: SA:CF 2.5 mg/m³: SCBAF/SAF/SAT:CF 10 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Eye pain, blurred vision, lac, rhin, head, tight chest, cyan; anor, nau, vomit, diarr; weak, twitch, para, Cheyne-Stokes resp, convuls; low BP, card irregularities; local sweating	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CNS, resp sys, CVS, GI tract
Clothing: Goggles: Wash: Change: Remove: Provide:	Any poss molt/Repeat liq-sol Any poss molt/Reason prob liq-sol Prompt contam After work if reason prob contam Prompt non-imperv contam Eyewash, quick drench	NIOSH/OSHA 25 mg/m³: DM[t] 50 mg/m³: DMXSQ[t]/SA[t]/SCBA 125 mg/m³: PAPRDM[t]/SA:CF[t] 250 mg/m³: SCBAF/SAF/HiEF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin; thermal skin burns; head; sore throat	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Skin, resp sys, eyes
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt wet N.R. Prompt non-imperv wet	NIOSH/OSHA 5000 ppm: SA/SCBA 12,500 ppm: SA:CF 15,000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin; conj; pulm edema	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Lungs, skin
Clothing: Goggles: Wash: Change: Remove:	Repeat Reason prob Prompt contam N.R. Prompt non-imperv contam	NIOSH/OSHA 5000 ppm: SA/SCBA 12,500 ppm: SA:CF 15,000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	CNS depres; pulm edema; skin, eye irrit; drow; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, skin

1,1,1,2-Tetrachloro-2,2-difluoroethane

7353

000214

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
1,1,2,2-Tetrachloroethane $CHCl_2CHCl_2$ 79-34-5 KI8575000 1702 55	Acetylene tetrachloride, Symmetrical tetrachloroethane 1 ppm = 7.00 mg/m³	NIOSH Ca See Appendix A 1 ppm (7 mg/m³) [skin] OSHA 1 ppm (7 mg/m³) [skin]	Ca [150 ppm]	Colorless to pale-yellow liquid with a pungent, chloroform-like odor.	MW: 167.9 BP: 296°F Sol: 0.3% Fl.P: NA IP: 11.10 eV Sp.Gr(77°F): 1.59 Noncombustible Liquid	VP(86°F): 9 mm FRZ: -33°F UEL: NA LEL: NA	Chemically-active metals, strong caustics, fuming sulfuric acid [Note: Degrades slowly when exposed to air.]	Char(pet); CS_2; GC/FID; III [#1019]
Tetrachloroethylene $Cl_2C{=}CCl_2$ 127-18-4 KX3850000 1897 74	Perchlorethylene, Perchloroethylene, Perk, Tetrachlorethylene 1 ppm = 6.89 mg/m³	NIOSH Ca See Appendix A Minimize workplace exposure concentrations; limit number of workers exposed. OSHA 25 ppm (170 mg/m³)	Ca [500 ppm]	Colorless liquid with a mild, chloroform-like odor.	MW: 165.8 BP: 250°F Sol(77°F): 0.02% Fl.P: NA IP: 9.32 eV Sp.Gr: 1.62 Noncombustible Liquid	VP: 14 mm FRZ: -2°F UEL: NA LEL: NA	Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
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: 593-680°F Sol: Insoluble Fl.P(oc): 410°F IP: ? Sp.Gr: 1.59-1.65 Combustible Solid	VP: <1 mm FRZ: 360°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; none; GC/FID; II(2) [#S130]
Tetraethyl lead (as Pb) $Pb(C_2H_5)_4$ 78-00-2 TP4550000 1649 56	Lead tetraethyl, TEL 1 ppm = 13.45 mg/m³	NIOSH/OSHA 0.075 mg/m³ [skin]	40 mg/m³	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: Insoluble 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; III [#2533]

000215

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: 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, enlarged tend liver; derm; monocy; kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Liver, kidneys, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh 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	Liver, kidneys, eyes, upper resp sys, CNS
Clothing: Any poss molt/Repeat liq-sol Goggles: Any poss molt/Reason prob liq-sol Wash: Prompt contam Change: After work if any poss contam Remove: Immed non-imperv contam molt/ Prompt non-imperv contam sol	NIOSH/OSHA 20 mg/m³: 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
Clothing: Any poss >0.1% Goggles: Reason prob Wash: N.R. Change: After work if any poss contam >0.1% Remove: Immed non-imperv contam (>0.1%) Provide: Quick drench (>0.1%)	NIOSH/OSHA 0.75 mg/m³: SA/SCBA 1.875 mg/m³: SA:CF 3.75 mg/m³: SCBAF/SAF/SAT:CF 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, spastic; bradycardia, hypotension, hypothermia, pallor, nau, anor, low-wgt; disorientation, halu, psychosis, mania, convuls, coma; eye irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, CVS, kidneys, eyes

Tetraethyl lead (as Pb)

7353

000216

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Tetrahydrofuran C_4H_8O 109-99-9 LU5950000 2056 26	Diethylene oxide; 1,4-Epoxybutane; Tetramethylene oxide; THF 1 ppm = 3.00 mg/m³	NIOSH/OSHA 200 ppm (590 mg/m³) ST 250 ppm (735 mg/m³)	20,000 ppm [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; III [#1609]
Tetramethyl lead (as Pb) $Pb(CH_3)_4$ 75-74-1 TP4725000 1649 56	Lead tetramethyl, TML 1 ppm = 11.11 mg/m³	NIOSH/OSHA 0.075 mg/m³ [skin]	40 mg/m³	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: Insoluble 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; III [#2534]
Tetramethyl succinonitrile $(CH_3)_2C(CN)C(CN)(CH_3)_2$ 3333-52-6 WN4025000	Tetramethyl succino-dinitrile, TMSN	NIOSH/OSHA 3 mg/m³ (0.5 ppm) [skin]	5 ppm	Colorless, odorless solid.	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; II(3) [#S155]
Tetranitromethane $C(NO_2)_4$ 509-14-8 PB4025000 1510 47	Tetan, TNM 1 ppm = 8.15 mg/m³	NIOSH/OSHA 1 ppm (8 mg/m³)	5 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: May decompose explosively if contaminated with combustible material.]	Imp; none; GC/Alk-FID; II(3) [#S224]

000217

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: PAPROV[c]/CCRFOV 5000 ppm: SA:CF[c] 10,000 ppm: GMFOV/SCBAF/SAF 20,000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, upper resp sys; nau, dizz, head	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Clothing: Any poss >1.06% Goggles: Reason prob Wash: N.R. Change: N.R. Remove: Immed non-imperv contam Provide: >1.06%: Quick drench	NIOSH/OSHA 0.75 mg/m³: SA/SCBA 1.875 mg/m³: SA:CF 3.75 mg/m³: SCBAF/SAF/SAT:CF 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: Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	CNS, CVS, kidneys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 30 mg/m³: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Head, nau; convuls, coma	Eye: Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	CNS
Clothing: Reason prob Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Immed wet (flamm) Provide: Eyewash	NIOSH/OSHA 5 ppm: SA:CF[c]/PAPRS[c,s]/CCRFS[s]/GMFS[s]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS[s]/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; dizz, head; chest pain, dysp; methemoglobinuria, cyan; skin burns	Eye: Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin, blood, CNS

Tetranitromethane

7353

211

000218

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
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/m³ [skin]	N.E.	Colorless to yellow, odorless, crystalline solid.	MW: 287.2 BP: 356-374°F (Explodes) Sol: Insoluble Fl.P: Explodes IP: ? Sp.Gr: 1.57 Combustible Solid	VP: Low MLT: 268°F UEL: ? LEL: ?	Oxidizable materials, hydrazine	Filter; Reagent; Vis; II(3) [#S225]
Thallium (soluble compounds as Tl) 7440-28-0 XG3425000 1707 53 (cmpds)	Synonyms vary depending upon the specific soluble compound.	NIOSH/OSHA 0.1 mg/m³ [skin]	20 mg/m³	Appearance and odor vary depending upon the specific soluble compound.	Properties vary depending upon the specific soluble compound.		None reported	Filter; Acid; AA; II(3) [#S306]
Thiram $(CH_3)_2NC(S)SSC(S)N(CH_3)_2$ 137-26-8 JO1400000 2771 55	bis(Dimethylthiocarbamoyl) disulfide, Tetramethylthiuram disulfide	NIOSH/OSHA 5 mg/m³	1500 mg/m³	Colorless to yellow, crystalline solid. [Note: Commercial pesticide products may be dyed blue.]	MW: 240.4 BP: Decomposes Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.29 Combustible Solid	VP: Low MLT: 312°F UEL: ? LEL: ?	Strong oxidizers, strong acids, oxidizable materials	Filter; CH_3CN; HPLC/UVD; III [#5005]
Tin (inorganic compounds except oxides, as Sn) Sn 7440-31-5 (Metal) XP7320000 (Metal)	Metal: Metallic tin, Tin flake, Tin powder Synonyms of other inorganic compounds vary depending upon the specific compound.	NIOSH/OSHA 2 mg/m³	400 mg/m³	Metal: Gray to almost silver-white, ductile, malleable, lustrous solid.	MW: 118.7 BP: 4545°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 7.28 (Metal) Metal: Noncombustible Solid, but powdered form may ignite.	VP: 0 mm (approx) MLT: 449°F UEL: NA LEL: NA	Chlorine, turpentine, acids, alkalis	Filter; Acid; AA; I(3) [#S183]

000219

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 7.5 mg/m³: DM 15 mg/m³: DMXSQ*/SA*/SCBA* 37.5 mg/m³: PAPRDM*/SA:CF* 75 mg/m³: HiEF/SCBAF/SAF 3000 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; sneezing; anemia; ftg; cough, coryza; irrity; mal, head, lass, insom; nau, vomit	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, CNS, skin; in animals: liver, kidneys
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 0.5 mg/m³: DM^ 1 mg/m³: DMXSQ^/SA/SCBA 2.5 mg/m³: PAPRDM^/SA:CF 5 mg/m³: HiEF/SCBAF/SAF/PAPRTHIE/SAT:CF 20 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 tightness, 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, CNS, lungs; liver, kidneys, GI tract, body hair
Clothing: Reason prob Goggles: Reason prob Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 50 mg/m³: CCROVDMFu*/SA*/SCBA* 125 mg/m³: PAPROVDMFu*/SA:CF* 250 mg/m³: SCBAF/SAF/CCRFOVHIE/PAPRTOVHIE*/GMFOVHIE 1500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit muc memb; derm; with ethanol consumption: flush, eryt, pruritus, urticaria, head, nau, vomit, diarr, weak, dizz, dysp	Eye: Skin: Irr immed Swallow: Soap wash prompt Medical attention immed	Resp sys, skin
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 10 mg/m³: DM* 20 mg/m³: DMXSQ^*/SA*/SCBA* 50 mg/m³: PAPRDM^*/SA:CF* 100 mg/m³: HIEF/SCBAF/SAF 400 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Tin (inorganic compounds except oxides, as Sn)					

7353

213

000220

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Tin (organic compounds as Sn)	Synonyms vary depending upon the specific organic compound.	NIOSH/OSHA 0.1 mg/m³ [skin]	Unknown	Appearance and odor vary depending upon the specific organic compound.	Properties vary depending upon the specific organic compound.		Strong oxidizers	Filter/ XAD-2; HPLC; AA; III [#5504]
Titanium dioxide TiO_2 13463-67-7 XR2275000	Rutile, Titanium oxide, Titanium peroxide	NIOSH Ca See Appendix A OSHA 10 mg/m³	Ca [N.E.]	White, odorless powder.	MW: 79.9 BP: 4532 to 5432°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.26 Noncombustible Solid	VP: 0 mm (approx) MLT: 3326 to 3362°F UEL: NA LEL: NA	None reported	Filter; Acid; AA; II(3) [#S385]
Toluene $C_6H_5CH_3$ 108-88-3 XS5250000 1294 27	Methyl benzene, Methyl benzol, Phenyl methane, Toluol 1 ppm = 3.83 mg/m³	NIOSH/OSHA 100 ppm (375 mg/m³) ST 150 ppm (560 mg/m³)	2000 ppm	Colorless liquid with a sweet, pungent, benzene-like odor.	MW: 92.1 BP: 232°F Sol(61°F): 0.05% Fl.P: 40°F IP: 8.82 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP(65°F): 20 mm FRZ: -139°F UEL: 7.1% LEL: 1.2%	Strong oxidizers	Char; CS_2; GC/FID; III [#1500, Hydrocarbons]
Toluene-2,4-diisocyanate $CH_3C_6H_3(NCO)_2$ 584-84-9 CZ6300000 2078 57	TDI; 2,4-TDI; 2,4-Toluene diisocyanate 1 ppm = 7.24 mg/m³	NIOSH Ca See Appendix A 0.005 ppm (0.04 mg/m³) ST 0.02 ppm (0.15 mg/m³) OSHA 0.005 ppm (0.04 mg/m³) ST 0.02 ppm (0.15 mg/m³)	Ca [10 ppm]	Colorless to pale-yellow solid or liquid (above 71°F) with a sharp, pungent odor.	MW: 174.2 BP: 484°F Sol: Insoluble Fl.P: 260°F IP: ? Sp.Gr: 1.22 Class IIIB Combustible Liquid	VP(77°F): 0.01 mm MLT: 71°F UEL: 9.5% LEL: 0.9%	Strong oxidizers, water, acids, bases & amines may cause foam and spatter; alcohols [Note: Reacts slowly with water to form carbon dioxide and polyureas.]	Coated glass wool; Methanol; HPLC/UVD; III [#2535]

000221

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum 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 1 mg/m³: CCROVDM/SA/SCBA 2.5 mg/m³: SA:CF/PAPROVDM 5 mg/m³: CCRFOVHiE/SCBAF/SAF/GMFOVHiE/PAPRTOVHiE/SAT:CF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Head, vertl; irrit eyes; psycho-neurologic dist; sore throat, cough; abdom pain, vomit; urine retention; paresis, focal anes; skin burns; pruritus; in animals: hemolysis, hepatic nec	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	CNS, eyes, liver, urinary tract, skin, blood
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH ¥: SCBAF:PD/PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Slight lung fib; [carc]	Breath:	Resp support	Lungs
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCROV*/SA*/PAPROV*/SCBA* 2000 ppm: SA:CF*/SCBAF/SAF/GMFOV §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Ftg, weak; conf, euph, dizz, head; dilated pupils, lac; ner, musc ftg, insom; pares; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	CNS, liver, kidneys, skin
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit nose, throat; choke, paroxysmal cough; chest pain, retster soreness; nau, vomit, abdom pain; bron spasm, pulm edema; dysp, asthma; conj, lac; derm, skin sens; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, skin

Toluene-2,4-diisocyanate

7353

000222

Chemical name, structure/formula, CAS and RTECS Nos., and 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-Toluidine $CH_3C_6H_4NH_2$ 95-53-4 XU2975000 1708 55	o-Aminotoluene, 2-Aminotoluene, 1-Methyl-2-aminobenzene, o-Methylaniline, 2-Methylaniline, ortho-Toluidine 1 ppm = 4.46 mg/m³	NIOSH Ca See Appendix A 2 ppm (9 mg/m³) [skin] OSHA 5 ppm (22 mg/m³) [skin]	Ca [100 ppm] ACGIH A2	Colorless to pale-yellow liquid with an aromatic, aniline-like odor.	MW: 107.2 BP: 392°F Sol: 2% Fl.P: 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	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
Tributyl phosphate $(CH_3[CH_2]_3O)_3PO$ 126-73-8 TC7700000 1 ppm = 11.07 mg/m³	Butyl phosphate, TBP, Tributyl ester of phosphoric acid, tri-n-Butyl phosphate	NIOSH/OSHA 0.2 ppm (2.5 mg/m³)	125 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(351°F): 127 mm FRZ: -112°F UEL: ? LEL: ?	None reported	Filter; Diethyl ether; GC/FPD; II(3) [#S208]
1,1,2-Trichloroethane $CHCl_2CH_2Cl$ 79-00-5 KJ3150000 2831 74	beta-Trichloroethane, Vinyl trichloride 1 ppm = 5.55 mg/m³	NIOSH Ca See Appendix A 10 ppm (45 mg/m³) [skin] OSHA 10 ppm (45 mg/m³) [skin]	Ca [500 ppm]	Colorless liquid with a sweet, chloroform-like odor.	MW: 133.4 BP: 237°F Sol: 0.4% Fl.P: NA IP: 11.00 eV Sp.Gr: 1.44 Noncombustible Liquid	VP: 19 mm FRZ: -34°F UEL: NA LEL: NA	Strong oxidizers & caustics; chemically-active metals such as aluminum, magnesium powders, sodium & potassium	Char; CS_2; GC/FID; III [#1003, Halogenated Hydrocarbons]
Trichloroethylene $ClCH=CCl_2$ 79-01-6 KX4550000 1710 74	Ethylene trichloride, Triclene, Trichloroethene 1 ppm = 5.46 mg/m³	NIOSH Ca See Appendix A 25 ppm OSHA 50 ppm (270 mg/m³) ST 200 ppm (1080 mg/m³)	Ca [1000 ppm]	Colorless liquid (unless dyed blue) with a chloroform-like odor.	MW: 131.4 BP: 189°F Sol(77°F): 0.1% Fl.P: 90°F IP: 9.45 eV Sp.Gr: 1.46 Class IC Flammable 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_2; GC/FID; III [#1022]

000223

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia, head, cyan; weak, dizz, drow; micro hematuria, eye burns; derm; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Blood, kidneys, liver, CVS, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH/OSHA 2 ppm: SA/SCBA 5 ppm: SA:CF 10 ppm: SCBAF/SAF 125 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Con Ing	Eyes, resp, skin irrit; head; nau	Eye: Skin: Breath: Irr immed Swallow: Soap wash prompt Resp support Medical attention immed	Resp sys, skin, eyes
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit nose, eyes; CNS depres; liver, kidney damage; [carc]	Eye: Skin: Breath: Irr immed Swallow: Soap wash prompt Resp support Medical attention immed	CNS, eyes, nose, liver, kidneys
Clothing: Repeat Goggles: Reason prob Wash: Prompt wet Change: N.R. Remove: Prompt non-imperv wet	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head, verti; vis dist, tremors, som, nau, vomit; irrit eyes; derm; card arrhy, pares; [carc]	Eye: Skin: Breath: Irr immed Swallow: Soap wash prompt Resp support Medical attention immed	Resp sys, heart, liver, kidneys, CNS, skin

Trichloroethylene

7353

000224

217

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
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 II(2) [#S128]
1,2,3-Trichloropropane $CH_2ClCHClCH_2Cl$ 96-18-4 TZ9275000	Allyl trichloride, Glycerol trichlorohydrin, Glyceryl trichlorohydrin, Trichlorohydrin 1 ppm = 6.13 mg/m³	NIOSH Ca See Appendix A 10 ppm (60 mg/m³) [skin] OSHA 10 ppm (60 mg/m³)	Ca [1000 ppm]	Colorless liquid with a chloroform-like odor.	MW: 147.4 BP: 314°F Sol: 0.1% Fl.P(oc): 180°F IP: ? Sp.Gr: 1.39 Class IIIA Combustible Liquid	VP(115°F): 10 mm FRZ: 6°F UEL: ? LEL: ?	Chemically-active metals, strong caustics & oxidizers	Char; CS_2; GC/FID III [#1003, Halogenated Hydrocarbons]
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 = 7.79 mg/m³	NIOSH/OSHA 1000 ppm (7600 mg/m³) ST 1250 ppm (9500 mg/m³)	4500 ppm	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations. [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_2; GC/FID III [#1020]
Triethylamine $(C_2H_5)_3N$ 121-44-8 YE0175000 1296 68	TEA 1 ppm = 4.21 mg/m³	NIOSH See Appendix D OSHA 10 ppm (40 mg/m³) ST 15 ppm (60 mg/m³)	1000 ppm	Colorless liquid with a strong, ammonia-like odor.	MW: 101.2 BP: 193°F Sol: 2% Fl.P(oc): 16°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	Bub; NaOH; GC/FID II(3) [#S152]

000225

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: Goggles: Wash: Change: Remove:	Any poss molt-fume/ Repeat liq-sol Any poss molt/Reason prob liq-sol Prompt contam After work if reason prob contam sol Immed non-imperv contam molt/Prompt non-imperv contam sol	NIOSH/OSHA 50 mg/m³: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Acne-form derm; anor, nau; vertl; jaun, liver inj	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, liver
Clothing: Goggles: Wash: Change: Remove: Provide:	Repeat Any poss Immed contam N.R. Immed non-imperv contam Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, throat; CNS depres; liver inj; skin irrit; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, skin, CNS, liver
Clothing: Goggles: Wash: Change: Remove:	Repeat Any poss Prompt wet N.R. Prompt non-imperv wet	NIOSH/OSHA 4500 ppm: SA/SCBA §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit throat, drow, derm; in animals: card arrhy	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, heart
Clothing: Goggles: Wash: Change: Remove: Provide:	Repeat Any poss Immed contam N.R. Immed wet (flamm) >1%: Eyewash, quick drench	OSHA 250 ppm: SA:CF[t] 500 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Abs Con	Irrit eyes, resp sys, skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, eyes, skin

Triethylamine

7353

000226

7353

220

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Trifluorobromomethane $CBrF_3$ 75-63-8 PA5425000 1009 12	Bromotrifluoromethane, Fluorocarbon 1301, Freon® 13B1, Halocarbon 13B1, Halon® 1301, Monobromotrifluoromethane, Refrigerant 13B1, Trifluoromonobromomethane 1 ppm = 6.19 mg/m³	NIOSH/OSHA 1000 ppm (6100 mg/m³)	50,000 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 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; III [#1017]
2,4,6-Trinitrotoluene $CH_3C_6H_2(NO_2)_3$ 118-96-7 XU0175000 1356 33 (wet)	1-Methyl-2,4,6-trinitrobenzene; TNT; Trinitrotoluene; sym-Trinitrotoluene; Trinitrotoluol	NIOSH/OSHA 0.5 mg/m³ [skin]	N.E.	Colorless to pale-yellow, odorless solid or crushed flakes. [Note: Classified as a high explosive.]	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	VP(180°F): 0.05 mm MLT: 176°F UEL: ? LEL: ?	Strong oxidizers, ammonia, strong alkalis, combustible materials, heat [Note: Rapid heating will result in detonation.]	Tenax GC; Acetone; GC/TEA; OSHA [#44]
Triorthocresyl phosphate $(CH_3C_6H_4O)_3PO$ 78-30-8 TD0350000 2574 55	TCP, TOCP, Tri-o-cresyl ester of phosphoric acid, Tri-o-cresyl phosphate, o-Trinitrotoluol 1 ppm = 15.31 mg/m³	NIOSH/OSHA 0.1 mg/m³ [skin]	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; II(3) [#S209]
Triphenyl phosphate $(C_6H_5O)_3PO$ 115-86-6 TC8400000	Phenyl phosphate, TPP, Triphenyl ester of phosphoric acid	NIOSH/OSHA 3 mg/m³	N.E.	Colorless, crystalline powder with a phenol-like odor.	MW: 326.3 BP: 776°F Sol: Insoluble Fl.P: 428°F IP: ? Sp.Gr: 1.29 Combustible Solid	VP(380°F): 1 mm MLT: 120°F UEL: ? LEL: ?	None reported	Filter; Diethyl ether; GC/FPD; II(3) [#S210]

000227

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF/SAT:CF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Ll-head; card arrhy	Breath:	Resp support	Heart, CNS
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam/daily Change: After work if reason prob contam Remove: Prompt non-imperv contam	NIOSH/OSHA 5 mg/m³: SA*/SCBA* 12.5 mg/m³: SA:CF* 25 mg/m³: SCBAF/SAF 1000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Liver damage, jaun; cyan; sneezing; cough, sore throat; peri neur, musc pain; kidney damage; cataract; sens derm; leucyt; anemia; card irregularities	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Blood, liver, eyes, CVS, CNS, kidneys, skin
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA/SCBA 2.5 mg/m³: PAPRDM/SA:CF 5 mg/m³: HiEF/PAPRTHiE/SCBAF/SAF/SAT:CF 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
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 15 mg/m³: D 30 mg/m³: DXSQ/SA/SCBA/HiE 75 mg/m³: PAPRDM/SA:CF 150 mg/m³: HiEF/PAPRTHiE/SAT:CF SCBAF/SAF 1500 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

Triphenyl phosphate

7353

000228

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Turpentine $C_{10}H_{16}$ (approx) 8006-64-2 YO8400000 1299 27	Gumspirits, Gum turpentine, Spirits of turpentine, Steam distilled turpentine, Sulfate wood turpentine, Turps, Wood turpentine 1 ppm ≈ 5.65 mg/m³	NIOSH/OSHA 100 ppm (560 mg/m³)	1500 ppm	Colorless liquid with a characteristic odor.	MW: 136(approx) BP: 309-338°F Sol: Insoluble Fl.P: 95°F IP: ? Sp.Gr: 0.86 Class IC Flammable Liquid	VP(77°F): 5 mm FRZ: -58 to -76°F UEL: ? LEL: 0.8%	Strong oxidizers, chlorine, chromic anhydride, stannic chloride	Char; CS_2; GC/FID; III [#1551]
Uranium (insoluble compounds as U) U 7440-61-1 (Metal) YR3490000 (Metal) 2979 65 (Metal) 9175 65 (Metal)	Metal: Uranium I Synonyms of other insoluble compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A 0.2 mg/m³ ST 0.6 mg/m³ OSHA 0.2 mg/m³ ST 0.6 mg/m³	Ca [30 mg/m³]	Metal: Silver-white, malleable, ductile, lustrous solid. [Note: Weakly radioactive.]	MW: 238.0 BP: 6895°F Sol: Insoluble Fl.P: ? IP: NA Sp.Gr(77°F): 19.05 (Metal) Metal: Combustible Solid, especially turnings and powder.	VP: 0 mm (approx) MLT: 2097°F UEL: ? LEL: ?	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 compound.	NIOSH Ca See Appendix A 0.05 mg/m³ OSHA 0.05 mg/m³	Ca [20 mg/m³]	Appearance and odor vary depending upon the specific soluble compound.	Properties vary depending upon the specific soluble compound.		Uranyl nitrates: combustibles. Uranium hexafluoride: water.	None available
Vanadium pentoxide (respirable dust as V_2O_5) V_2O_5 1314-62-1 YW2450000 2862 55	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide	NIOSH C 0.05 mg/m³ [15-min] OSHA 0.05 mg/m³	70 mg/m³	Yellow-orange powder or dark gray, odorless flakes dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.8% Fl.P: NA IP: NA 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; III [#7504]

000229

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCRFOV/PAPROV[£] 1500 ppm: SA:CF[£]/GMFOV/SCBAF/SAF $: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, verti; hema, album; skin irrit, sens	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, eyes, kidneys, resp sys
Clothing: Repeat Goggles: Any poss Wash: Prompt contam Change: After work if reason prob contam Remove: Prompt non-imperv contam Provide: Eyewash	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con Ing	Derm; [carc]; in animals: lung, lymph node damage; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, bone marrow, lymphatics
Clothing: Any poss UF_6/Repeat Goggles: Any poss Wash: Prompt contam/UF_6: Immed contam and daily Change: After work if reason prob contam/UF_6: After work if any poss contam Remove: Prompt non-imperv contam/ UF_6: Immed non-imperv contam Provide: Eyewash (UF_6),quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape(Halides): GMFAGHIE/SCBAE Escape(Non-halides): HiEF/SCBAE	Inh Con Ing	Lac, conj; short breath, cough, chest rales; nau, vomit; skin burns; RBC, casts in urine; album; high BUN; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, blood, liver, kidneys, lymphatics, skin, bone marrow
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	NIOSH/OSHA 0.5 mg/m³: HiE*/SA*/SCBA* 1.25 mg/m³: SA:CF*/PAPRHiE* 2.5 mg/m³: HiEF/SCBAF/SAF/ PAPRTHiE* 70 mg/m³: SAF:PD,PP $: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes; green tongue, metallic taste, eczema; cough; fine rales, wheez, bron, dysp; irrit throat	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, skin, eyes

Vanadium pentoxide (respirable dust as V_2O_5)

7353

223

000230

Chemical name, structure/formula, CAS and RTECS Nos., and 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)
Vanadium pentoxide (respirable fume as V_2O_5) V_2O_5 1314-62-1 YW2460000 2862 55	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide	NIOSH C 0.05 mg/m³ [15-min] OSHA 0.05 mg/m³	70 mg/m³	Finely divided particulate dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.1% Fl.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; III [#7504]
Vinyl chloride CH_2=CHCl 75-01-4 KU9625000 1086 17	Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM) 1 ppm = 2.60 mg/m³	NIOSH Ca See Appendix A Lowest reliably detectable concentration. OSHA [1910.1017] 1 ppm C 5 ppm [15-min]	Ca – ACGIH A1	Colorless gas or liquid (below 56°F) with a pleasant odor at high concentrations. [Note: Shipped as a liquefied compressed gas.]	MW: 62.5 BP: 7°F Sol(77°F): 0.1% Fl.P: NA (Gas) IP: 9.99 eV Flammable Gas	VP: >1 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; III [#1007]
Vinyl toluene CH_2=CHC$_6$H$_4$CH$_3$ 25013-15-4 WL5075000 2618 27	Ethenylmethylbenzene, Methylstyrene, Tolyethylene 1 ppm = 4.91 mg/m³	NIOSH/OSHA 100 ppm (480 mg/m³) ACGIH 50 ppm (240 mg/m³)	5000 ppm	Colorless liquid with a strong, disagreeable odor.	MW: 118.2 BP: 339°F Sol: 0.009% Fl.P: 120°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; III [#1501, Aromatic Hydrocarbons]
Warfarin $C_{19}H_{16}O_4$ 81-81-2 GN4550000 3027 55 (Coumarin derivative pesticide)	3-(alpha-Acetonyl)-benzyl-4-hydroxycoumarin, 4-Hydroxy-3-(3-oxo-1-phenyl butyl)-2H-1-benzopyran-2-one, WARF	NIOSH/OSHA 0.1 mg/m³	350 mg/m³	Colorless, odorless, crystalline powder. [pesticide]	MW: 308.3 BP: Decomposes Sol: 0.002% Fl.P: ? IP: ? Combustible Solid	VP(71°F): 0.09 mm MLT: 322°F UEL: ? LEL: ?	Strong oxidizers	Filter; Methanol; HPLC/UVD; III [#5002]

000231

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)		First aid (See Table 6)	Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 0.5 mg/m³: HIE*/SA*/SCBA* 1.25 mg/m³: SA:CF*/PAPRHIE* 2.5 mg/m³: HIEF/SCBAF/SAF/PAPRTHIE* 70 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eye; green tongue, metallic taste; irrit throat, cough, fine rales, wheez, bron, dysp; eczema	Breath:	Resp support	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed contam/daily Change: After work if any poss contam Remove: Immed contam Provide: Eyewash, quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Weak; abdom pain, GI bleeding; hepatomegaly; pallor or cyan of extremities; [carc]	Breath:	Resp support	Liver, CNS, blood, resp sys, lymphatic sys
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Prompt non-imperv contam	ACGIH 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, skin, upper resp sys; drow	Eye: Skin: Breath: Swallow:	Irr immed Soap flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat Goggles: N.R. Wash: Prompt contam Change: After work if any poss contam Remove: Prompt non-impery contam	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA/SCBA 2.5 mg/m³: PAPRDM/SA:CF 5 mg/m³: HIEF/PAPRTHIE/SCBAF/SAF/SAT:CF 100 mg/m³: SA:PD,PP 200 mg/m³: SAF: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; abnormal hematologic indices	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Blood, CVS
Warfarin						

7353

225

000232

Chemical name, structure/formula, CAS and RTECS Nos., and 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	 VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Xylenes (o-, m-, p- isomers) $C_6H_4(CH_3)_2$ 1330-20-7 ZE2100000 1307 27	o: 1,2-Dimethylbenzene; o-Xylol, m: 1,3-Dimethylbenzene; m-Xylol, p: 1,4-Dimethylbenzene; p-Xylol 1 ppm = 4.41 mg/m³	NIOSH/OSHA 100 ppm (435 mg/m³) ST 150 ppm (655 mg/m³)	1000 ppm	Colorless liquids with an aromatic odor. [Note: Pure p-xylene is a solid below 56°F.]	MW: 106.2 BP: 292/269/281°F Sol: Insoluble Fl.P: 63/84/81°F IP: 8.56/8.56/8.44 eV Sp.Gr: 0.88/0.86/0.86 Class IB Flammable Liquid (o) Class IC Flammable Liquids (m,p)	VP: 7/9/9 mm FRZ: -13/-54/56°F UEL: 7.0/7.0/7.0% LEL: 1.1/1.0/1.1%	Strong oxidizers	Char; CS_2; GC/FID; III [#1501, Aromatic Hydrocarbons]
Xylidine $(CH_3)_2C_6H_3NH_2$ 1300-73-8 ZE8575000 1711 55	Aminodimethylbenzene, Aminoxylene, Dimethylaminobenzene, Dimethylaniline, Xylidine isomers, Xylidine (mixed o-, m-, p-) 1 ppm = 5.04 mg/m³	NIOSH/OSHA 2 ppm (10 mg/m³) [skin]	150 ppm	Pale-yellow to brown liquid with a weak, aromatic, amine-like odor.	MW: 121.2 BP: 415-439°F Sol: Slight Fl.P: 206°F IP: ? Sp.Gr: 0.98 Class IIIB Combustible Liquid	VP: <1 mm FRZ: ? UEL: ? LEL: 1.0%	Strong oxidizers, hypochlorite bleaches	Si gel; Ethanol; GC/FID; III [#2002]
Yttrium compounds (as Y) Y 7440-65-5 (Metal) ZG2980000 (Metal)	Metal: Yttrium metal Synonyms of other compounds vary depending upon the specific compound.	NIOSH/OSHA 1 mg/m³	N.E.	Metal: Dark gray to black solid.	MW: 88.9 BP: 5301°F Sol: ? 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; III [#7300, Elements]
Zinc chloride fume $ZnCl_2$ 7646-85-7 ZH1400000	None	NIOSH/OSHA 1 mg/m³ ST 2 mg/m³	4800 mg/m³	White particulate dispersed in air.	MW: 136.3 BP: 1350°F Sol(77°F): 432% Fl.P: NA IP: NA Sp.Gr(77°F): 2.91 Noncombustible Solid	VP: 0 mm (approx) MLT: 554°F UEL: NA LEL: NA	Potassium	None available

000233

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection + maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Clothing: Repeat Goggles: Reason prob Wash: Prompt contam Change: N.R. Remove: Immed wet (flamm)	NIOSH/OSHA 1000 ppm: CCROV*/PAPROV*/SA*/SCBA* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Dizz, excitement, drow, inco, staggering gait; irrit eyes, nose, throat; corneal vacuolization; anor, nau, vomit, abdom pain; derm	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	CNS, eyes, GI tract, blood, liver, kidneys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed contam Change: N.R. Remove: Immed non-imperv contam Provide: Eyewash, quick drench	NIOSH/OSHA 20 ppm: CCROV/SA/SCBA 50 ppm: SA:CF/PAPROV 100 ppm: CCRFOV/PAPRTOV/GMFOV/SCBAF/SAF 150 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia, cyan; lung, liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Blood, lungs, liver, kidneys, CVS
Clothing: N.R. Goggles: Any poss Wash: N.R. Change: N.R. Remove: N.R. Provide: Eyewash	NIOSH/OSHA 5 mg/m³: DM 10 mg/m³: DMXSO/SA/SCBA 25 mg/m³: PAPRDM/SA:CF 50 mg/m³: HiEF/PAPRTHiE/SAT:CF/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, lungs
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 10 mg/m³: DMFu*/SA*/SCBA* 25 mg/m³: PAPRDMFu*/SA:CF* 50 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 2000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Conj; irrit nose, throat; cough, copious sputum; dysp, chest pain, pulm edema, broncopneu; pulm fib, cor pulmonale; fever; cyan; tachypnea; burn skin; irrit skin, eyes	Breath: Resp support	Resp sys, skin, eyes

Zinc chloride fume

7353

000234

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228

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp.Gr, flammability	VP, FRZ UEL, LEL		
Zinc oxide fume ZnO 1314-13-2 ZH4810000	None	NIOSH/OSHA 5 mg/m³ ST 10 mg/m³	N.E.	Fine white, odorless particulate dispersed in air.	MW: 81.4 BP: ? Sol: Insoluble 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)	Filter; none; XRD; III [#7502]
Zirconium compounds (as Zr) Zr 7440-67-7 (Metal) ZH7070000 (Metal) 2008 37 (metal powder, dry) 1358 32 (metal powder, wet)	Metal: Zirconium metal Synonyms of other compounds vary depending upon the specific compound.	NIOSH 5 mg/m³ ST 10 mg/m³ [Zr compounds excluding Zirconium tetrachloride.] OSHA 5 mg/m³ ST 10 mg/m³	500 mg/m³	Metal: Soft, malleable, ductile, solid or gray to gold amorphous powder.	MW: 91.2 BP: 8471°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 6.51 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; III [#7300, Elements]

000235

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Clothing: N.R. Goggles: N.R. Wash: N.R. Change: N.R. Remove: N.R.	NIOSH/OSHA 50 mg/m³: DMFu/SA/SCBA 125 mg/m³: PAPRDMFu/SA:CF 250 mg/m³: HiEF/PAPRTHiE/SAT:CF SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Sweet, metallic taste; dry throat, cough; chills, fever; tight chest, dysp, rales, reduced pulm func; head; blurred vision; musc cramps, low back pain; nau, vomit; ftg, lass, mal	Breath:	Resp support	Resp sys
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 25 mg/m³: DM 50 mg/m³: DMXSQ/SA/SCBA 125 mg/m³: PAPRDM/SA:CF 250 mg/m³: HiEF/PAPRTHiE/SAT:CF/ SCBAF/SAF 500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Skin granulomas; in animals: X-ray evidence of retention in lungs; irrit skin, muc memb	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Resp sys, skin

Zirconium compounds (as Zr)

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000236

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APPENDIX A — NIOSH OCCUPATIONAL CARCINOGENS

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

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

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

000237

7353

APPENDIX B — THIRTEEN OSHA-REGULATED CARCINOGENS

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

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

000238

2353

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS

Asbestos

NIOSH considers asbestos to be a carcinogen and recommends that exposures be reduced to the lowest possible concentration. For asbestos fibers >5 micrometers in length, NIOSH recommends an 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 and NIOSH Analytical Method #7400.

The OSHA PEL for asbestos fibers is an 8-hour TWA airborne concentration of 0.2 fiber (longer than 5 micrometers and having a length-to-diameter ratio of at least 3 to 1) per cubic centimeter of air (0.2 fiber/cm^3), as determined by the membrane filter method at approximately 400X magnification with phase contrast illumination. An "action level" of 0.1 fiber/cm^3 as an 8-hour TWA was established as the concentration above which employers must initiate compliance activities such as worker training and medical surveillance.

ACGIH designates asbestos as a confirmed human carcinogen (A1) with the following TLVs: amosite, 0.5 fiber/cm^3; chrysotile, 2 fibers/cm^3; crocidolite, 0.2 fiber/cm^3; and other forms, 2 fibers/cm^3. ACGIH considers "fibers" to be those particles >5 micrometers in length with an aspect ratio equal to or greater than 3:1 as determined by the membrane filter method at 400 to 450X magnification (4-mm objective) with phase contrast illumination.

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) to be potential

000239

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

occupational carcinogens. The NIOSH REL (8-hour TWA) is 0.5 mg Cr/m³ for chromium metal and chromium(II) and chromium(III) compounds.

The OSHA PEL is 0.1 mg CrO_3/m³ (ceiling) for chromic acid and chromates; 0.5 mg Cr/m³ (8-hour TWA) for chromium(II) and chromium(III) compounds; and 1 mg Cr/m³ (8-hour TWA) for chromium metal.

ACGIH has various TLVs for chromium compounds. The 8-hour TWA is 0.5 mg Cr/m³ for chromium metal, for chromium(II) compounds (e.g., chromous chloride and chromous sulfate), and for chromium(III) compounds (e.g., chromic oxide, chromic sulfate, chromic chloride, chromic potassium sulfate, and chromite ore). The 8-hour TWA is 0.05 mg Cr(VI)/m³ for water-soluble Cr(VI) compounds, which include chromic acid and its anhydride, and the monochromates and dichromates of sodium, potassium, ammonium, lithium, cesium, and rubidium. The 8-hour TWA is 0.05 mg Cr/m³ for certain water-insoluble Cr(VI) compounds that are designated as confirmed human carcinogens (A1) (including zinc chromate, calcium chromate, lead chromate, barium chromate, strontium chromate, and sintered chromium trioxide).

Coal Tar Pitch Volatiles

The OSHA PEL (8-hour TWA) for coal tar pitch volatiles is 0.2 mg/m³ (benzene-soluble fraction). OSHA defines "coal tar pitch volatiles" as the fused polycyclic hydrocarbons that volatilize from the distillation residues of coal, petroleum, wood, and other organic matter such as anthracene, benzo(a)pyrene (BaP), phenanthrene, acridine, chrysene, pyrene, etc. Asphalt is not covered under the OSHA standard for coal tar pitch volatiles.

7353

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

NIOSH considers coal tar products (i.e., coal tar, coal tar pitch, or creosote) to be carcinogenic (Ca); the NIOSH REL (10-hour TWA) for coal tar products is 0.1 mg/m³ (cyclohexane-extractable fraction).

ACGIH designates coal tar pitch volatiles as a confirmed human carcinogen (A1) with an 8-hour TWA of 0.2 mg/m³ (benzene-solubles).

Cotton Dust (raw)

The NIOSH REL for cotton dust is 0.200 mg/m³ (lint-free cotton dust).

As found in the OSHA Table Z-1-A (29 CFR 1910.1000), the PEL for cotton dust (raw) is 1 mg/m³ for the cotton waste processing operations of waste recycling (sorting, blending, cleaning, and willowing) and garretting. PELs for other sectors (as found in 29 CFR 1910.1043) are 0.200 mg/m³ for yarn manufacturing and cotton washing operations, 0.500 mg/m³ for textile mill waste house operations or for dust from "lower grade washed cotton" used during yarn manufacturing, and 0.750 mg/m³ 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.

The ACGIH TLV for cotton dust (raw) is 0.200 mg/m³ (lint-free dust) as an 8-hour TWA measured by the vertical elutriator cotton-dust sampler.

000241

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 for the following substances included in the *Pocket Guide* were adequate to protect workers from recognized health hazards: acetylene tetrabromide, chlorobenzene, ethyl bromide, ethyl chloride, ethyl ether, furfural, isopropyl acetate, isopropylamine, molybdenum (soluble compounds as Mo), nitromethane, and silica (amorphous). At that time, NIOSH also conducted a limited evaluation of the literature on magnesium oxide fume and molybdenum (insoluble compounds as Mo) and concluded that the documentation cited by OSHA was inadequate to support the proposed PELs of 10 mg/m^3.

7353

SYNONYM AND TRADE NAME INDEX

Acetylene dichloride, p. 88
Actinolite, p. 42
AGE, p. 36
Aminobenzene, p. 40
Aminoethane, p. 106
2-Aminoethanol, p. 104
Aminotoluene, p. 216
Ammate® herbicide, p. 38
Amosite, p. 42
Amyl methyl ketone, p. 144
Amyl ethyl ketone, p. 150
Anthophyllite, p. 42
Aroclor® 1242, p. 66
Aroclor® 1254, p. 66
BCME, p. 68
Benzol, p. 44
BGE, p. 54
Biphenyl, p. 100
Biphenylamine, p. 36
Bromochloromethane, p. 66
Bromoethane, p. 106
Bromomethane, p. 146
Bromotrifluoromethane, p. 220
Butanethiol, p. 54
Butanol, p. 52
Butyl cellosolve, p. 50
Butyl ethyl ketone, p. 108
Butyl methyl ketone, p. 122
Butyl phosphate, p. 216
Carbon tet, p. 60
Caustic soda, p. 198
Cellosolve®, p. 104
Cellosolve® acetate, p. 104
CFC 113, p. 218
2-Chloro-1,3-butadiene, p. 70
1-Chloro-2,3-epoxypropane, p. 102
Chlorobutadiene, p. 70
Chloroethane, p. 108
2-Chloroethanol, p. 108
Chloroethylene, p. 224
Chlorofluorocarbon 113, p. 218
Chloromethane, p. 146
3-Chloropropene, p. 36
Chrysotile, p. 42
Coal tar, p. 72
Creosote, p. 72
Cristobalite, p. 196
Crocidolite, p. 42

000243

7353

SYNONYM AND TRADE NAME INDEX (Continued)

DBCP, p. 82
DDVP, p. 90
DEHP, p. 100
DGE, p. 92
Diaminoethane, p. 108
1,2-Diaminoethane, p. 108
Diatomaceous earth, p. 194
DIBK, p. 92
Dibrom, p. 96
Dibromodifluoromethane, p. 92
Dichlorobenzol, p. 84
Dichloromethane, p. 150
Dichloromethyl ether, p. 68
1,2-Dichloropropane, p. 188
Diethyl ether, p. 112
Difluorodichloromethane, p. 86
Dihydroxybenzene, p. 128
2,6-Dimethyl-4-heptanone, p. 92
Dimethylaminobenzene, p. 226
Dimethylaniline, p. 226
Dimethylbenzene, p. 226
Diphenylmethane diisocyanate, p. 150
DMF, p. 96
DNT, p. 100
DOP, p. 100
Dowanol® 50B, p. 102
Dowtherm® A, p. 178
EGDN, p. 110
EGEE, p. 104
EGEEA, p. 104
EGME, p. 146
EGMEA, p. 146
2,3-Epoxy-1-propanol, p. 118
1,2-Epoxy propane, p. 190
Ethanethiol, p. 112
Ether, p. 112
Ethyl acetone, p. 174
Ethyl amyl ketone, p. 150
Ethyl methyl ketone, p. 48
Ethylene glycol monobutyl ether, p. 50
Ethylene glycol monoethyl ether, p. 104
Ethylene glycol monomethyl ether, p. 146
Ethylene glycol monoethyl ether acetate, p. 104
Ethylene glycol monomethyl ether acetate, p. 146
Ethylidene chloride, p. 86
Fluorocarbon 12, p. 86
Fluorocarbon 1011, p. 66
Fluorocarbon 1301, p. 220

000244

7353

SYNONYM AND TRADE NAME INDEX (Continued)

Fluorodichloromethane, p. 88
Formalin, p. 116
Freon® 10, p. 60
Freon® 11, p. 116
Freon® 12, p. 86
Freon® 21, p. 88
Freon® 112, p. 206
Freon® 112a, p. 206
Freon® 113, p. 218
Freon® 114, p. 90
Freon® 12B2, p. 92
Freon® 13B1, p. 220
Genetron® 113, p. 218
Glycol monoethyl ether acetate, p. 104
Guthion®, p. 42
Halocarbon 112, p. 206
Halocarbon 112a, p. 206
Halocarbon 113, p. 218
Halocarbon 13B1, p. 220
Halon® 104, p. 60
Halon® 112, p. 88
Halon® 122, p. 86
Halon® 242, p. 90
Halon® 1011, p. 66
Halon® 1202, p. 92
Halon® 1301, p. 220
Halowax®, pp. 208, 218
Halowax® 1013, p. 174
Halowax® 1014, p. 122
Halowax® 1051, p. 168
2-Heptanone, p. 144
3-Heptanone, p. 108
Hydrobromic acid, p. 124
Hydrochloric acid, p. 126
Hydrofluoric acid, p. 126
IGE, p. 134
Isobutanol, p. 132
Isopropanol, p. 132
Isopropyl benzene, p. 76
Lime, p. 56
Lye, p. 198
MAPP gas, p. 142
MBK, p. 122
MDI, p. 150
MEK, p. 48
Methanol, p. 144
Methanethiol, p. 154
Methoxyaniline, p. 40

000245

7353

SYNONYM AND TRADE NAME INDEX (Continued)

2-Methoxyethanol, p. 146
Methyl amyl alcohol, p. 152
Methyl azinphos, p. 42
Methyl benzene, p. 214
Methyl butyl ketone, p. 122
Methylchloromethyl ether, p. 68
Methyl cyanide, p. 32
Methyl ethyl ketone, p. 48
Methyl isobutyl ketone, p. 124
Methyl phenol, p. 74
Methyl propyl ketone, p. 174
Methyl sulfate, p. 98
Methylaniline, p. 216
Mevinphos, p. 180
MIBK, p. 124
Monoxide, p. 60
MPK, p. 174
Naled, p. 96
Naphthyl thiourea, p. 40
Nitrochloroform, p. 70
Nitrodiphenyl, p. 162
Nitrotoluol, p. 168
Nitrotrichloromethane, p. 70
Octalene, p. 34
Octyl phthalate, p. 100
p-Benzoquinone, p. 192
PCB, p. 66
Perchloroethylene, p. 208
Peroxide, p. 126
Petroleum solvent, p. 198
PGE, p. 178
Phenyl alcohol, p. 176
Phenyl benzene, p. 100
Phenyl chloride, p. 64
Phenylamine, p. 40
Phenylethane, p. 106
Phenylethylene, p. 200
Pival®, p. 184
Polychlorinated biphenyl, p. 66
Propanol, p. 188
2-Propanone, p. 30
Propellant 12, p. 86
Propenol, p. 34
Propyne, p. 142
Pyrethrin, p. 190
Quartz, p. 196
Refrigerant 11, p. 116
Refrigerant 12, p. 86

000246

E-7353

SYNONYM AND TRADE NAME INDEX (Continued)

Refrigerant 21, p. 88
Refrigerant 112, p. 206
Refrigerant 112a, p. 206
Refrigerant 113, p. 218
Refrigerant 114, p. 90
Refrigerant 13B1, p. 220
Sesone, p. 74
Sevin®, p. 58
Sulfamate, p. 38
Sulfotepp, p. 204
Systox®, p. 80
TDI, p. 214
Tetrabromoethane, p. 32
Tetrachloromethane, p. 60
THF, p. 210
TNT, p. 220
Toluol, p. 214
Toxaphene, p. 62
Tremolite, p. 42
Tribromomethane, p. 48
1,1,1-Trichloroethane, p. 148
Trichlorofluoromethane, p. 116
Trichloromethane, p. 68
2,4,6-Trinitrophenol, p. 184
2,4,6-Trinitrophenyl-N-methylnitramine, p. 212
Tripoli, p. 196
Tridymite, p. 196
Vinyl benzene, p. 200
Vinyl cyanide, p. 34
Wood alcohol, p. 144

000247

7353

CAS NUMBER INDEX

10-02-8, p. 32
50-00-0, p. 116
50-29-3, p. 80
53-96-3, p. 32
54-11-5, p. 160
55-63-0, p. 166
56-23-5, p. 60
56-38-2, p. 172
57-14-7, p. 96
57-24-9, p. 198
57-57-8, p. 186
57-74-9, p. 60
58-89-9, p. 136
60-11-7, p. 94
60-29-7, p. 112
60-34-4, p. 152
60-57-1, p. 90
62-53-3, p. 40
62-73-7, p. 90
62-74-8, p. 196
62-75-9, p. 168
63-25-2, p. 58
64-18-6, p. 118
64-19-7, p. 30
67-56-1, p. 144
67-63-0, p. 132
67-64-1, p. 30
67-66-3, p. 68
67-72-1, p. 122
68-12-2, p. 96
71-23-8, p. 188
71-36-3, p. 52
71-43-2, p. 44
71-55-6, p. 148
72-20-8, p. 102
72-43-5, p. 140
74-83-9, p. 146
74-87-3, p. 146
74-88-4, p. 152
74-89-5, p. 144
74-90-8, p. 126
74-93-1, p. 154
74-96-4, p. 106
74-97-5, p. 66
74-98-6, p. 186
74-99-7, p. 142
75-00-3, p. 108
75-01-4, p. 224
75-04-7, p. 106
75-05-8, p. 32
75-07-0, p. 30
75-08-1, p. 112
75-09-2, p. 150
75-15-0, p. 60
75-21-8, p. 112
75-25-2, p. 48
75-31-0, p. 134
75-34-3, p. 86
75-43-4, p. 88
75-44-5, p. 180
75-52-5, p. 166
75-55-8, p. 188
75-56-9, p. 190
75-61-6, p. 92
75-63-8, p. 220
75-65-0, p. 52
75-69-4, p. 116
75-71-8, p. 86
75-74-1, p. 210
76-06-2, p. 70
76-11-9, p. 206
76-12-0, p. 206
76-13-1, p. 218
76-14-2, p. 90
76-22-2, p. 58
76-44-8, p. 120
77-78-1, p. 98
78-00-2, p. 208
78-10-4, p. 114
78-30-8, p. 220
78-59-1, p. 132
78-83-1, p. 132
78-87-5, p. 188
78-92-2, p. 52
78-93-3, p. 48
79-00-5, p. 216
79-01-6, p. 216
79-06-1, p. 34
79-20-9, p. 142
79-24-3, p. 164
79-27-6, p. 32
79-34-5, p. 208
79-46-9, p. 166
80-62-6, p. 154
81-81-2, p. 224
83-26-1, p. 184

241

000248

7353

CAS NUMBER INDEX (Continued)

83-79-4, p. 194
84-74-2, p. 84
85-44-9, p. 184
86-50-0, p. 42
86-88-4, p. 40
87-86-5, p. 174
88-72-2, p. 168
88-89-1, p. 184
90-04-0, p. 40
91-20-3, p. 158
91-59-8, p. 158
91-94-1, p. 86
92-52-4, p. 100
92-67-1, p. 36
92-87-5, p. 44
92-93-3, p. 162
93-76-5, p. 202
94-36-0, p. 44
94-75-7, p. 80
95-50-1, p. 84
95-53-4, p. 216
96-12-8, p. 82
96-18-4, p. 218
96-33-3, p. 142
98-00-0, p. 118
98-01-1, p. 118
98-51-1, p. 54
98-82-8, p. 76
98-83-9, p. 154
98-95-3, p. 162
99-08-1, p. 168
99-65-0, p. 98
99-99-0, p. 168
100-00-5, p. 164
100-01-6, p. 162
100-25-4, p. 98
100-37-8, p. 92
100-41-4, p. 106
100-42-5, p. 200
100-44-7, p. 46
100-74-3, p. 114
100-61-8, p. 156
100-63-0, p. 180
101-68-8, p. 150
101-84-8, p. 178
104-94-9, p. 40
105-46-4, p. 50
106-35-4, p. 108
106-46-7, p. 84
106-50-3, p. 178
106-51-4, p. 192
106-89-8, p. 102
106-92-3, p. 36
106-93-4, p. 110
106-99-0, p. 48
107-02-8, p. 32
107-05-1, p. 36
107-06-2, p. 110
107-07-3, p. 108
107-13-1, p. 34
107-15-3, p. 108
107-18-6, p. 34
107-20-0, p. 64
107-30-2, p. 68
107-31-3, p. 150
107-49-3, p. 206
107-66-4, p. 84
107-87-9, p. 174
108-03-2, p. 166
108-10-1, p. 124
108-11-2, p. 152
108-18-9, p. 94
108-20-3, p. 134
108-21-4, p. 132
108-24-7, p. 30
108-31-6, p. 138
108-83-8, p. 92
108-84-9, p. 124
108-87-2, p. 148
108-88-3, p. 214
108-90-7, p. 64
108-93-0, p. 78
108-94-1, p. 78
108-95-2, p. 176
109-60-4, p. 188
109-66-0, p. 174
109-73-9, p. 52
109-79-5, p. 54
109-86-4, p. 146
109-87-5, p. 144
109-89-7, p. 90
109-94-4, p. 112
109-99-9, p. 210
110-19-0, p. 130
110-43-0, p. 144
110-49-6, p. 146

000249

CAS NUMBER INDEX (Continued)

110-54-3, p. 122
110-80-5, p. 104
110-82-7, p. 76
110-83-8, p. 78
110-91-8, p. 156
110-86-1, p. 190
111-15-9, p. 104
111-44-4, p. 88
111-65-9, p. 168
111-76-2, p. 50
115-86-6, p. 220
117-81-7, p. 100
118-52-5, p. 86
118-96-7, p. 220
121-44-8, p. 218
121-69-7, p. 96
121-75-5, p. 138
122-60-1, p. 178
123-31-9, p. 128
123-42-2, p. 82
123-51-3, p. 130
123-73-9, p. 76
123-86-4, p. 50
123-91-1, p. 100
123-92-2, p. 130
124-38-9, p. 58
124-40-3, p. 94
126-73-8, p. 216
126-99-8, p. 70
127-18-4, p. 208
127-19-5, p. 94
131-11-3, p. 98
134-32-7, p. 158
136-78-7, p. 74
137-26-8, p. 212
140-88-5, p. 106
141-43-5, p. 104
141-78-6, p. 104
141-79-7, p. 140
142-82-5, p. 120
143-33-9, p. 76
144-62-7, p. 170
151-50-8, p. 76
151-56-4, p. 110
299-84-3, p. 192
300-76-5, p. 96
302-01-2, p. 124
309-00-2, p. 34
334-88-3, p. 82
463-51-4, p. 134
479-45-8, p. 212
504-29-0, p. 36
509-14-8, p. 210
528-29-0, p. 98
528-75-4, p. 130
532-27-4, p. 64
534-52-1, p. 98
540-59-0, p. 88
540-88-5, p. 50
541-85-5, p. 150
542-88-1, p. 68
542-92-7, p. 78
556-52-5, p. 118
583-60-8, p. 148
584-84-9, p. 214
591-78-6, p. 122
594-42-3, p. 176
594-72-9, p. 88
600-25-9, p. 68
624-83-9, p. 152
626-38-0, p. 38
627-13-4, p. 190
628-63-7, p. 38
628-96-6, p. 110
630-08-0, p. 60
1189-85-1, p. 54
1300-73-8, p. 226
1303-86-2, p. 46
1305-78-8, p. 56
1306-19-0, p. 56
1309-37-1, p. 130
1309-48-4, p. 138
1310-73-2, p. 198
1314-13-2, p. 228
1314-62-1, p. 222
1314-62-1, p. 224
1314-80-3, p. 182
1317-38-0, p. 74
1319-77-3, p. 74
1321-64-8, p. 174
1321-65-9, p. 218
1330-20-7, p. 226
1332-21-4, p. 42
1333-86-4, p. 58
1335-88-2, p. 208
1335-87-1, p. 132

7353

CAS NUMBER INDEX (Continued)

1910-42-5, p. 172
2104-64-5, p. 102
2234-13-1, p. 168
2238-07-5, p. 92
2426-08-6, p. 54
2698-41-1, p. 66
2699-79-8, p. 202
3333-52-6, p. 210
3689-24-5, p. 204
4016-14-2, p. 134
5714-22-7, p. 202
7439-92-1, p. 136
7439-93-7, p. 156
7439-96-5, p. 138
7439-97-6, p. 140
7440-02-0, p. 160
7440-16-6, p. 192
7440-22-4, p. 196
7440-25-7, p. 204
7440-28-0, p. 212
7440-31-5, p. 212
7440-36-0, p. 40
7440-41-7, p. 46
7440-43-9, p. 56
7440-47-3, p. 70
7440-48-4, p. 72
7440-50-8, p. 72
7440-50-8, p. 74
7440-58-6, p. 120
7440-61-1, p. 222
7440-65-5, p. 226
7440-67-7, p. 228
7446-09-5, p. 200
7553-56-2, p. 128
7580-67-8, p. 136
7616-94-6, p. 176
7631-86-9, p. 194
7637-07-2, p. 46
7646-85-7, p. 226
7647-01-0, p. 126
7664-38-2, p. 182
7664-39-3, p. 126
7664-41-7, p. 38
7664-93-9, p. 200
7681-49-4, p. 116
7697-37-2, p. 160
7719-12-2, p. 184
7722-84-1, p. 126
7723-14-0, p. 182
7726-95-6, p. 48
7738-94-5, p. 70
7740-38-2, p. 42
7773-06-0, p. 38
7778-44-1, p. 56
7782-41-4, p. 116
7782-42-5, p. 120
7782-49-2, p. 194
7782-50-5, p. 62
7783-06-4, p. 128
7783-07-5, p. 128
7783-41-7, p. 170
7783-54-2, p. 164
7783-79-1, p. 194
7783-80-4, p. 204
7784-42-1, p. 42
7786-34-7, p. 180
7790-91-2, p. 64
7803-51-2, p. 180
7803-52-3, p. 198
8001-35-2, p. 62
8002-05-9, p. 176
8003-34-7, p. 190
8004-13-5, p. 178
8006-64-2, p. 222
8012-95-1, p. 170
8030-30-6, p. 158
8052-41-3, p. 198
8065-48-3, p. 80
10022-31-8, p. 44
10025-67-9, p. 200
10026-13-8, p. 182
10028-15-6, p. 172
10035-10-6, p. 124
10049-04-4, p. 62
10102-43-9, p. 162
10102-44-0, p. 164
10361-37-2, p. 44
11097-69-1, p. 66
12001-26-2, p. 154
12604-58-9, p. 114
13463-39-3, p. 160
13463-67-7, p. 214
13494-80-9, p. 204
14484-64-1, p. 114
14807-96-6, p. 202
14808-60-7, p. 196

000251

7353

CAS NUMBER INDEX (Continued)

15096-52-3, p. 116
17702-41-9, p. 80
19287-45-7, p. 82
19624-22-7, p. 172
20816-12-0, p. 170
25013-15-4, p. 224
25321-14-6, p. 100
25639-42-3, p. 148
26140-60-3, p. 206
34590-94-8, p. 102
53469-21-9, p. 66
55720-99-5, p. 62
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68476-85-7, p. 136

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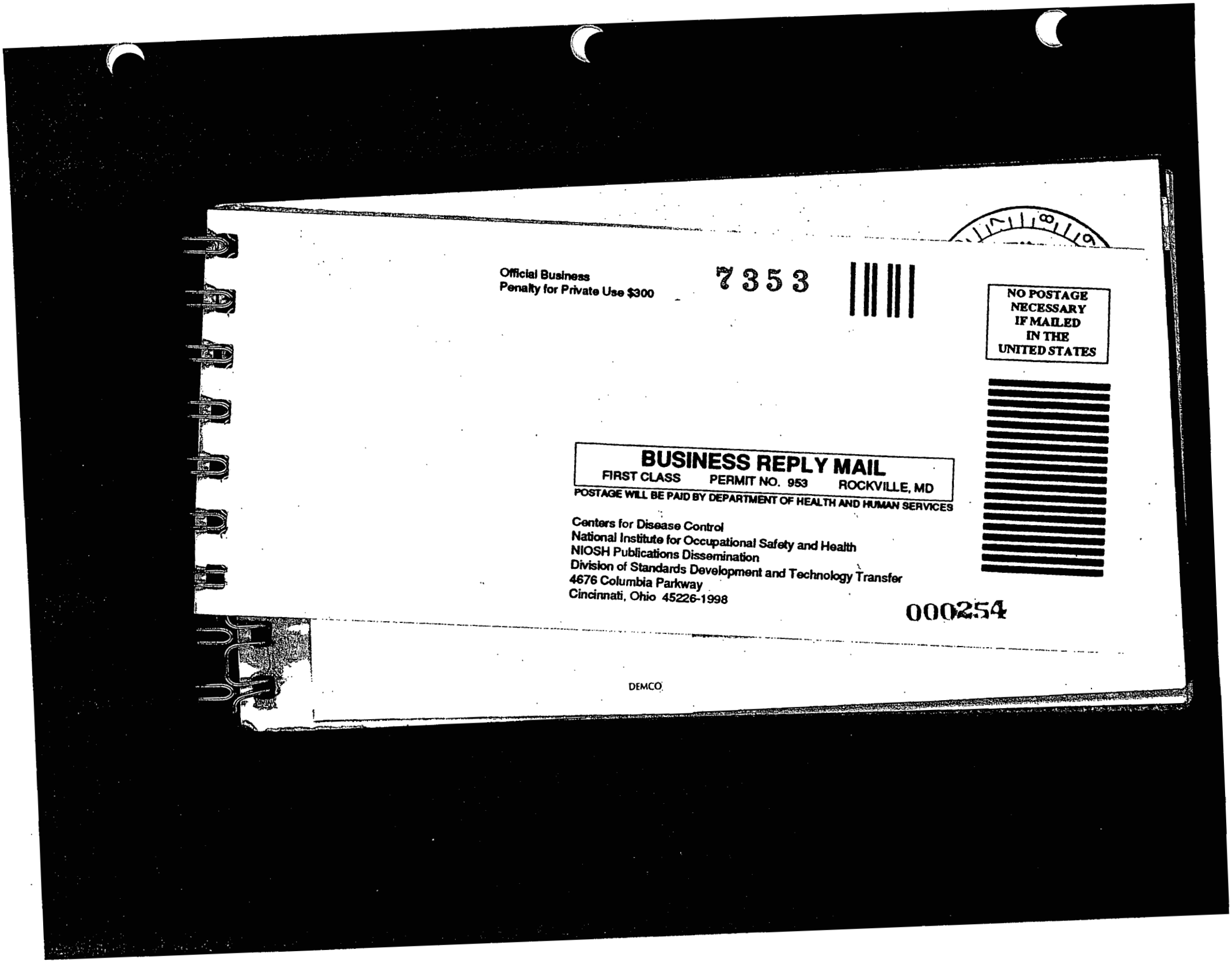

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