

DENT

RA

11

.B15

A251285

no.85-114

**Pen and Ink Changes to
NIOSH Pocket Guide to Chemical Hazards**

Please make the following corrections in this publication:

- Page 60 Delete *Butadiene IDLH Level*.
- Page 116 For the first *Chemical name and formula* listed, change 2-Ethoxyethylacetate and $C_2H_5OCH_2CH_2OOCCH_2$ to 2-Ethoxyethanol and $C_2H_5OCH_2OH$.
- Page 128 For *Formaldehyde NIOSH REL*, under Exposure Limits, add 0.016 ppm (as an 8-hour TWA) to the 15-minute ceiling value.
- Page 132 Delete *Hexachloroethane IDLH Level*.
- Page 150 For *Maleic anhydride IDLH Level*, change N.A. to 500 ppm.
- Page 155 For *Methyl acetylene Respirator Selection*, change 11,000 ppm to 17,000 ppm.
- Page 155 For *Methyl acetylene-propadiene mixture Respirator Selection*, change 17,000 ppm to 20,000 ppm.
- Page 196 For *Phthalic anhydride IDLH Level*, change 10,000 ppm to 1670 ppm.

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**

September 1985

*For sale by the Superintendent of Documents, U.S. Government
Printing Office, Washington, D.C. 20402*

DHHS (NIOSH) Publication No. 85-114

First Printing—September 1985

Second Printing—February 1987
with minor technical changes

ACKNOWLEDGEMENTS

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 criteria used in this Pocket Guide. The initial development of this document was performed by Frank W. Mackison, Lawrence J. Partridge Jr., and R. Scott Stricoff.

In addition, we would like to express our gratitude to the following people for their assistance in preparing the document (formatting, typing, and proofreading): A. Ritchey for supervision of clerical staff during preparation of this Pocket Guide, S. Bonzo, S. Clark, F. Darks, M. DiMuzio, B. Ellis, M. Gran, M. Ivory, S. Marksberry, C. McClellan, M. Redmond, P. Schweickart, M. Swenk, and C. Welch; K. Varner and C. Browning for editorial review; F. Tremmel, D. Votaw, E. Spirer, S. Baburich, M. Brown, and M. Georgevich for preparation of respirator tables, and N. Bollinger for review; S. Rabinovitz for the development of the respirator selection codes; and H. Ludwig for technical review of this revision.

Also, thanks are due to those individuals who reviewed and constructively commented on this Pocket Guide during its development.

PREFACE

The Pocket Guide to Chemical Hazards presents information taken, in part, from the NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards. The information is presented in a tabular format for ease and convenient use as a quick reference source relating to general industrial hygiene and medical surveillance practices. The information contained in this Pocket Guide includes: chemical names and synonyms, exposure limits and recommendations, chemical and physical properties, analytical methods, respiratory and personal protective equipment recommendations, signs and symptoms of exposure, and procedures for emergency treatment.

The information assembled for the original printing was the result of an effort undertaken jointly by the National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor (DOL) to develop supplemental requirements for approximately 400 workplace environmental exposure standards adopted by the Occupational Safety and Health Administration (OSHA) in 1971. The information was set forth in draft technical standards which were transmitted to OSHA in rule making.

This printing of the Pocket Guide represents the efforts of NIOSH and includes addition of the following substances: arsenic, asbestos, beryllium, vinyl chloride, and thirteen carcinogens for which standards were promulgated by OSHA in 1974. Also included are revisions in respirator selection for each chemical, an update of NIOSH recommended exposure limits (REL's) and the American Conference of Governmental Industrial Hygienists (ACGIH) TLVs*, and where identified, a notation of the appropriate Chemical Abstract Service (CAS), Registry of Toxic Effects and Chemical Substances (RTECS), and U.S. Department of Transportation (DOT) numbers for each chemical.

Since the draft technical standards were written in a legal format, this Pocket Guide was developed as a vehicle for making the technical information contained in those draft standards more conveniently available to workers, employers, and occupational health professionals.

I. INTRODUCTION

This Pocket Guide to Chemical Hazards is presented as a source of general industrial hygiene and medical surveillance information for workers, employers, and occupational health professionals. The Pocket Guide does not attempt to present all pertinent data. Rather, it presents key information and data in an abbreviated tabular format for 398 individual chemicals or chemical types (e.g., cyanides, copper dusts and mists) found in the work environment and for which there are specific Federal regulations. The implementation of the industrial hygiene and medical surveillance practices recommended in this Pocket Guide will assist in initiating and maintaining effective occupational health programs for the protection of workers.

Background

The National Institute for Occupational Safety and Health (NIOSH), which is responsible for undertaking research and developing recommended health and safety standards, joined together in 1974 with the Occupational Safety and Health Administration (OSHA), whose jurisdictions include promulgation and enforcement activities, to develop a series of complete occupational health standards

for those substances with existing permissible exposure limits (PEL's). This joint effort, labeled the Standards Completion Program (SCP), involved the cooperative efforts of several contractors and personnel from various Divisions within both NIOSH and OSHA. The output from this program included approximately 400 substance-specific draft standards and supporting documentation which contained technical information and recommendations needed for the promulgation of new occupational health regulations.

Thus, an extensive data base of information useful to the entire occupational health community and the worker was developed. This information is updated periodically to reflect new data regarding the toxicity of the substance and any changes made 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, Current Intelligence Bulletins, Special Hazard Reviews, and Occupational Hazard Assessments; recognized textbooks in the fields of industrial hygiene, medicine, toxicology, and analytical chemistry; and articles from a variety of technical journals.

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 recommendations or limits of exposure to potentially hazardous substances or conditions in the workplace. It also recommends appropriate preventive measures designed to reduce or eliminate adverse health 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 potential 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/or appropriate preventive measures designed to reduce or eliminate adverse health effects.

Current Intelligence Bulletins are based on the evaluation of new information on a particular hazard in light of previously known toxicology, production, and use data. The data contained therein are a prompt review and evaluation of information received by NIOSH on occupational hazards

that are either unrecognized or greater than generally known.

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, from a safety and health standpoint, specific problems associated with a given agent or hazard such as a potential for injury or for carcinogenic, mutagenic, or teratogenic effects, and to recommend appropriate control and surveillance methods. Although they are not intended to supplant the more comprehensive criteria documents, they are prepared in such a way as to assist OSHA or MSHA in the formulation of regulations.

Besides the aforementioned publications, NIOSH also periodically presents testimony before various Congressional committees and at OSHA rule-making hearings.

The intent of the following table is to provide, in plain-reference form, a list of those substances and conditions for which NIOSH has made recommendations and the dates of their transmittal or testimony to OSHA. Unless otherwise noted in the table, the recommendations are published in criteria documents.

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986**

Hazard	Date of Completion
2-Acetylaminofluorene	September 1973, NIOSH testimony at OSHA hearing
Acetylene	July 1976
Acrylamide	October 1978
Acrylonitrile	January 1978; revised March 1978, NIOSH testimony at OSHA hearing
Aldrin/dieldrin (Special Hazard Review)	September 1978
Alkanes (C5-C8)	March 1977
Allyl chloride	September 1976
4-Aminodiphenyl	September 1973, NIOSH testimony at OSHA hearing
Ammonia	July 1974
Animal rendering processes	March 1981 (Occupational Hazard Assessment)
Antimony and compounds	September 1978
Arsenic, inorganic	September 1974; revised June 1975; reaffirmed July 1982, NIOSH testimony at OSHA hearing
Arsine (ClB)	August 1979
Asbestos	January 1972; revised December 1976; revised March 1984, NIOSH testimony at Congressional hearing; reaffirmed June 1984, NIOSH testimony at OSHA hearing

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Asphalt fumes	September 1977
Benzene	July 1974; revised August 1976; revised July 1977 and March 1986, NIOSH testimony at OSHA hearings
Benzidine-based dyes (Special Hazard Review)	January 1980; revised January 1983 in "Preventing Health Hazards from . . . Benzidine Congener Dyes"
Benzidine	September 1973, NIOSH testimony at OSHA hearing
Benzoyl peroxide	June 1977
Benzyl chloride	August 1978
Beryllium	June 1972; revised August 1977, NIOSH testimony at OSHA hearing
Boron trifluoride	December 1976
1,3-Butadiene (CIB)	February 1984
Cadmium	August 1976; revised September 1984 in CIB
Carbaryl	September 1976
Carbon black	September 1978
Carbon dioxide	August 1976
Carbon disulfide	May 1977
Carbon monoxide	August 1972
Carbon tetrachloride	December 1975; revised June 1979

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1988—Continued**

Hazard	Date of Completion
Chlorine	May 1976
Chloroethanes (CIB)	August 1978
Chloroform	September 1976; revised June 1976
bis-Chloromethyl ether	September 1973, NIOSH testimony at OSHA hearing
Chloromethyl methyl ether	September 1973, NIOSH testimony at OSHA hearing
Chloroprene	August 1977
Chromic acid	July 1973; revised December 1975 [see Chromium (VI)]
Chromium (VI)	December 1975
Chrysene (Special Hazard Review)	June 1978
Coal gasification plants	September 1978
Coal liquefaction (Occupational Hazard Assessment)	June 1981
Coal tar products	September 1977
Cobalt (Occupational Hazard Assessment)	October 1981
Coke oven emissions	February 1973; revised November 1975, NIOSH testimony at OSHA hearing
Confined spaces, working in	December 1979
Cotton dust	September 1974; reaffirmed September 1983, NIOSH testimony at OSHA hearing
Cresol	February 1978

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
DDT (Special Hazard Review)	September 1978
2,4-Diaminoanisole and its salts (CIB)	January 1978
o-Dianisidine-based dyes (Joint NIOSH/OSHA Health Hazard Alert)	December 1980
Dibromochloropropane	January 1978
3,3'-Dichlorobenzidine	September 1973, NIOSH testimony at OSHA hearing
Di-ethylhexyl phthalate (see Di-sec-octyl phthalate in Chemical Listing)	March 1983 (Special Hazard Review)
Disocyanates	September 1978
4-Dimethylaminoazobenzene	September 1973, NIOSH testimony at OSHA hearing
Dinitro-ortho-cresol	February 1978
Dinitrotoluene (CIB)	July 1985
Dioxane	September 1977
Dioxin	See 2,3,7,8-Tetrachlorodibenzo-p-dioxin
Elevated workstations, emergency egress from	December 1975
Epichlorohydrin	September 1976; revised October 1978 in CIB
Ethyfene dibromide	August 1977; revised November 1983; reaffirmed February 1984, NIOSH testimony at OSHA hearing
Ethylene dichloride	March 1976; revised April 1978 in CIB; revised September 1978

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Ethyleneimine	September 1973, NIOSH testimony at OSHA hearing
Ethylene oxide (Special Hazard Review)	September 1977; revised July 1983, NIOSH testimony at OSHA hearing
Ethylene thiourea (Special Hazard Review)	October 1978
Excavations, development of draft construction safety standards for (Technical Guideline)	May 1983
Fibrous glass	April 1977
Fluorides, inorganic	June 1975
Fluorocarbon polymers, decomposition products of	September 1977
Formaldehyde	December 1976; revised April 1981 in CIB; revised May 1986, NIOSH testimony at OSHA hearing
Foundries	September 1985
Furfuryl alcohol	March 1979
Glycidyl ethers	June 1978; revised October 1978 in CIB
Glycol ethers (CIB)	May 1983
Grain elevators and feed mills, occupational safety in (Technical Guideline)	September 1983; reaffirmed June 1984, NIOSH testimony at OSHA hearing
Hot environments	June 1972; revised April 1986
Hydrazines	June 1978
Hydrogen cyanide and cyanide salts	October 1976

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Hydrogen fluoride	March 1976
Hydrogen sulfide	May 1977
Hydroquinone	April 1978
Identification system for occupationally hazardous materials	December 1974
Isopropyl alcohol	March 1976
Kepone	January 1976
Ketones	June 1978
8 Land-based oil and gas well drilling, comprehensive safety recommendations for (Technical Guideline)	September 1983; reaffirmed March 1984, NIOSH testimony at OSHA hearing
Lead, inorganic	January 1973; revised May 1978
Lockout/tagout, guidelines for controlling hazardous energy during maintenance and servicing (Technical Guideline)	September 1983
Logging from felling to first haul	July 1976
Malathion	June 1976
Mercury, inorganic	August 1973
Methyl alcohol	March 1976

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Methyl chloromethyl ether	See Chloromethyl methyl ether
4,4'-Methylenebis (2-chloroaniline) (Special Hazard Review)	September 1978
Methylene chloride	March 1976; revised April 1986 in CIB
Methyl parathion	September 1976
Monohalomethanes (CIB)	September 1984
alpha-Naphthylamine	September 1973, NIOSH testimony at OSHA hearing
beta-Naphthylamine	September 1973, NIOSH testimony at OSHA hearing
Niax® Catalyst ESN (Joint NIOSH/OSHA CIB)	May 1978
Nickel carbonyl (Special Hazard Review)	May 1977
Nickel, inorganic	May 1977
Nitric acid	March 1976
Nitriles	September 1978
4-Nitrobiphenyl	September 1973, NIOSH testimony at OSHA hearing
Nitrogen, oxides of	March 1976
Nitroglycerin and ethylene glycol dinitrate (EGDN)	June 1978
2-Nitronaphthalene	December 1976
2-Nitropropane (CIB)	April 1977; revised October 1980 in Joint OSHA/NIOSH Health Hazard Alert

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
N-Nitrosodimethylamine	September 1973, NIOSH testimony at OSHA hearing
Noise	August 1972
Organotin compounds (See Tin, organic compounds in Chemical Listing)	November 1976
Paint and allied coating products, manufacture of	September 1984
Parathion	June 1976
Pesticides, manufacture and formulation of	July 1978
Phenol	July 1976
Phenyl-beta-naphthylamine (CIB)	December 1976
Phosgene	February 1976
Polychlorinated biphenyls (See Chlorodiphenyl in Chemical Listing)	September 1977; reaffirmed February 1986 in CIB
Precast concrete products industry, comprehensive safety recommendations for (Technical Guideline)	June 1984
beta-Propiolactone	September 1973, NIOSH testimony at OSHA hearing
Refined petroleum solvents (See Petroleum distillates and Stoddard solvent in Chemical Listing)	July 1977
Silica, crystalline	November 1974

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Sodium hydroxide	September 1975
Styrene	September 1983
Sulfur dioxide	February 1974; revised May 1977, NIOSH testimony at OSHA hearing
Sulfuric acid	June 1974
2,3,7,8-Tetrachlorodibenzo-p-dioxin	January 1984; reaffirmed February 1986 in CIB
1,1,2,2-Tetrachloroethane	December 1976; revised August 1978 in CIB
Tetrachloroethylene (perchloroethylene)	July 1976; revised January 1978 in CIB
Thiols (n-alkane mono thiols, cyclohexanethiol, and benzenethiol)	September 1978
o-Tolidine	August 1978
o-Tolidine-based dyes (Joint NIOSH/OSHA Health Hazard Alert)	December 1980
Toluene	January 1974
Toluene diisocyanate	July 1973; revised September 1978 (see Diisocyanates)
1,1,1-Trichloroethane (See Methyl chloroform in Chemical Listing)	July 1976; revised August 1978 in CIB
1,1,2-Trichloroethane (CIB)	August 1978
Trichloroethylene	July 1973; revised January 1978 in Special Hazard Review

**POTENTIALLY HAZARDOUS SUBSTANCES OR CONDITIONS EVALUATED BY NIOSH THROUGH
JULY 1986—Continued**

Hazard	Date of Completion
Trimellitic anhydride (CIB)	February 1978
Tungsten and cemented tungsten carbide	September 1977
Ultraviolet radiation	December 1972
Vanadium	August 1977
Vibration syndrome (CIB)	March 1983
Vinyl acetate	September 1978
Vinyl chloride	March 1974; reaffirmed June 1974, NIOSH testimony at OSHA hearing
Vinyl halides	September 1978
Waste anesthetic gases and vapors	March 1977
Xylene	May 1975
Zinc oxide	October 1975

III. HOW TO USE THIS POCKET GUIDE

This Pocket Guide has been designed as a pocket-sized publication that can be utilized to provide chemical-specific data to supplement general industrial hygiene knowledge. In order to maximize the amount of data provided within a limited amount of space, extensive use has been made of abbreviations and symbolic codes. Discussed in the following sections are the codes and abbreviations used in this Pocket Guide.

Chemical Name and Formula

The chemical name given is usually that found in 29 CFR 1910, Subpart Z, General Industry Standards for Toxic and Hazardous Substances (OSHA). The chemical formula is also provided.

Below the chemical formula is the Chemical Abstract Service (CAS) registry number. This number, in the format xxx-xx-x, is unique for each chemical and allows more efficient searching on other data bases such as the Chemical Substances Information Network (CSIN).

Also included is the NIOSH Registry of Toxic Effects of Chemical Substances (RTECS) number, in the format ABxxxxxxx. RTECS may be useful in obtaining additional information on a chemical.

Under the RTECS number, the U.S. Department of Transportation (DOT) UN or NA identification number and the corresponding guide number have been placed. 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 Hazardous Materials Emergency Response Guidebook, DOT P 5800.3.

Synonyms

Several common synonyms, if any, are listed for each chemical in this column.

Exposure Limits

The OSHA permissible exposure limit (PEL), as found in 29 CFR 1910, Subpart Z, General Industry Standards for Toxic and Hazardous Substances, is listed first. Unless noted otherwise, exposure limits are 8-hour time-weighted average (TWA) concentrations. OSHA ceiling concentrations shall not be exceeded at any time, unless noted otherwise.

Chemicals for which NIOSH has published recommendations, the NIOSH recommended exposure limits (REL's) (i.e., 8- or 10-hour TWA and/or ceiling) are also noted.

The American Conference of Governmental Industrial Hygienists (ACGIH) TWA and ceiling Threshold Limit Values (TLVs®) are also noted when they are less than the OSHA PEL. Carcinogenic substances for which a TLV has been assigned are listed as A1a and those for which environmental conditions have not been sufficiently de-

fined to assign a TLV are listed as A1b. Those chemicals suspected by ACGIH of having carcinogenic potential for man are designated as A2. Where appropriate, the ACGIH TLVs listed will be designated A1a, A1b, or A2. The ACGIH TLVs for 1986-87 are utilized in this revision of the Pocket Guide.

IDLH Level

The Immediately Dangerous to Life or Health (IDLH) level defined by the SCP only for the purpose of respirator selection represents a maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without experiencing any escape-impairing or irreversible health effects. Where the notation 'Ca' appears, NIOSH has recommended that the substance be treated as a potential human carcinogen; IDLH's are not listed for those substances. 'N.A.' indicates that an IDLH has not been assigned.

Physical Description

A brief description of the appearance and odor of each substance is provided.

Chemical and Physical Properties

A number of important chemical and physical properties are given for each substance:

MW: Molecular weight

BP: Boiling point at 1 atm*, °F

Sol: Solubility in water at 68°F*, % by weight

FL.P: Flash point, closed cup [or open cup if annotated (oc)], °F

IP: Ionization Potential, eV

VP: Vapor pressure at 68°F*, mmHg

MP: Melting point, °F

UEL: Upper explosive limit in air, % by volume

LEL: Lower explosive limit in air, % by volume

MEC: Minimum explosive concentration for a dust in air, g/l

*If so noted after a specific entry, these properties may be reported at other temperatures and pressures. 'N.A.' denotes not applicable and ? indicates unknown.

Incompatibilities

Potentially hazardous incompatibilities of each substance are listed.

Measurement Method

A brief, key word description of the suggested sampling and analytical method is provided. Each description is comprised of four components: (1) collection, (2) work-up, (3) analysis, and (4) the set code for ordering a description of the analytical method. The codes employed are listed in Table 1a.

Where the annotation 'NIOSH xx-xxx' or 'III' appears,

a measurement method has been published in the "NIOSH Manual of Analytical Methods," 2nd or 3rd Editions available from the U.S. Government Printing Office, Washington, D.C. 20402

For other methods appearing in this Pocket Guide, a full description may be found in the 'NIOSH Analytical Methods from the Standards Completion Program' series of publications, available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. The NTIS publication number and the set code for each chemical are found in Table 1b. Where a dash appears in this column, no method has been developed by NIOSH.

Personal Protection and Sanitation

A summary of recommended practices specific to each toxic substance is presented. These recommendations supplement general work practices (e.g., no eating where chemicals are used).

There are five primary categories of information, each of which refers to a recommended work practice when handling each substance, and a final category ('PROVIDE') for any item special to that substance.

CLOTHING: Personal protective clothing use.

GOGGLES: Eye protection use.

WASH: Cleaning spilled chemical from the body (supplements normal washing before eating, etc.).

CHANGE: Routine changing of work clothing.

REMOVE: Frequency and immediacy of clothing removal upon accidental contamination.

PROVIDE: Information specific for a substance such as providing quick drench facilities (e.g., emergency showers) and facilities for the emergency washing of the eyes.

Table 2 lists the definitions of the codes used.

Respirator Selection

A condensed table of allowable respiratory use is provided. For each line a maximum use concentration (in ppm, mg/m³, µg/m³, fibers/m³, or mppcf) condition (e.g., escape) followed by a series of codes representing classes of respirators is listed. Individual respirator codes are separated by slanted lines (/). For each maximum use concentration, only those respirators with the minimum required protection factor and meeting other use restrictions based on the NIOSH decision logic, are listed. All recommended respirators of a given class, can be utilized at any concentration equal to or less than the class's listed maximum use concentration. Respirator selection should follow recommendations that provide the greatest degree of protection.

In this Pocket Guide, single use respirators refer to those disposable-type respirators which have only been tested under provisions of 30 CFR 11.140-5 for which a

fivefold protection factor has been established. To determine if certain single-use respirators can be used in other applications, including a higher protection factor, consult the NIOSH Certified Equipment List (DHHS (NIOSH) Publication No. 86-101) to identify the conditions under which they may be used. If a higher protection factor is utilized, the wearer must first be properly fitted with a respirator using either a quantitative fit test or an "improved" qualitative fit test as accepted in the OSHA lead standard. Respirator selection recommendations are based on the NOISH REL's. For a chemical where no REL exists, recommendations are based on meeting the OSHA PEL's except where the ACGIH TLV for the chemical is lower.

All respirators selected shall be approved by NIOSH and the Mine Safety and Health Administration (MSHA). Pesticides are not identified as such in the respirator selection tables. For those substances that are pesticides, the recommended air-purifying respirator must be specifically approved by NIOSH/MSHA for usage with pesticides.

Additionally, a complete respirator protection program should be implemented including all requirements in 29 CFR 1910.134. At a minimum, a respirator protection program should include regular training, fit-testing, periodic environmental monitoring, maintenance inspection, and cleaning. The selection of the actual respirator to be used within the classes of recommended respirators depends on the particular use situation, and should only be made by a knowledgeable person. REMEMBER, air-purifying res-

pirators will not protect from oxygen-deficient atmospheres. For firefighting, only self-contained breathing apparatuses with full facepieces operated in pressure-demand or other positive pressure modes are recommended.

Codes employed for the various categories of respirators are defined in Table 3.

Route of Health Hazard

The toxicologically important routes of entry for each substance are listed. Abbreviations given are:

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

Symptoms

Potential symptoms as a result of exposure, and their respective abbreviations are defined in Table 4.

First Aid

First aid procedures are listed for response to eye and skin contact, inhalation, and ingestion of the toxic substance. Abbreviations are defined in Table 5.

Target Organs

The organs which are affected by exposure to each substance are listed. Abbreviations are defined in Table 4.

Table 1a
CODES FOR MEASUREMENT METHODS

COLLECTION

Ads	Adsorption tube
Bag	Gas collection bag
Bub	Bubbler
Bub (xxxx)	Bubbler containing xxxx
Char	Charcoal tube
Char (2)	2 Charcoal tubes in series
Char (pet)	Charcoal tube (petroleum)
Filter	Particulate filter
Filter (2)	2 Filters in series
Filt/bub	Filter plus bubbler
Imp	Impinger
Imp (xxxx)	Impinger containing xxxx
Resin	Resin adsorption tube
SiO ₂	Silica gel adsorption tube
Tenax	Tenax adsorption tube

WORK-UP

These codes are self-explanatory

ANALYSIS

AA	Atomic absorption spectrometry
Color	Colorimetric spectroscopy
Fluoro-spectro	Fluorescence spectrometry
GC	Gas chromatography

GL
 Gravimetric
 HGA

HPLC
 IC
 ICP
 IR
 ISE
 Titrate
 XRD

Gas-liquid chromatography
 Self-explanatory
 Flameless atomic absorption in a
 high-temperature graphite analyzer
 High-pressure liquid chromatography
 Ion chromatography
 Inductively coupled plasma
 Infrared spectrometry
 Ion-specific electrode
 Self-explanatory
 X-ray diffraction spectrometry

Table 1b
NTIS ORDER NUMBERS FOR VALIDATED
ANALYTICAL METHODS

Set Code	NTIS No.
A	PB245850
B	PB245851
C	PB245852
D	PB245935
E	PB246148
F	PB246149
G	PB265026
H	PB265027
I	PB265028
J	PB263959
K	PB254227
L	PB250159
M	PB265029
N	PB258433
O	PB262402
P	PB258434
Q	PB258435
R	PB262403
S	PB263871
T	PB262404
U	PB262405
V	PB262542
W	PB262406

Set 1	PB271712
Set 2	PB271464
Set 3	PB275834
Set 4	PB281038
Set 5	PB287499
Set 6	PB288629

NIOSH Manual of Analytical Methods - 2nd edition

77-157A	Vol. I
78-175	Vol. IV
79-141	Vol. V
80-125	Vol. VI
82-100	Vol. VII

III: NIOSH Manual of Analytical Methods - 3rd edition

Table 2
PERSONAL PROTECTION AND
SANITATION CODES

CLOTHING	Wear appropriate equipment to prevent:
AP liq/RP 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 of skin becoming wet with contaminant
≥x%AP/y%RP	Any possibility of skin contact with liquids containing ≥x% of contaminant, and repeated or prolonged skin contact with liquids containing y%
Prevent skin freezing	Self explanatory
Prevent contam or freeze	Skin contamination or freezing
Prevent wet or freeze	Skin becoming wet or frozen

Repeat prolong	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(xxx)	Any possibility of substance xxx contacting the eyes
Reason prob	Reasonable probability of eye contact

WASH	Employees should wash:
Contam ≥ x% immed/y% pro.	Immediately when skin is contaminated with liquids containing ≥ x% contaminant, and promptly when skin is contaminated with y%
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 upon contam	Immediately when skin becomes contaminated

Table 2
PERSONAL PROTECTION AND
SANITATION CODES (Continued)

Immed upon contam/daily	Immediately when skin becomes contaminated, and at the end of each work shift
Immed upon wet	Immediately when skin becomes wet
Immed wet/pro contam	Immediately when skin becomes wet, and promptly when skin becomes contaminated
Pro contam/ immed wet/daily ..	Promptly when skin becomes contaminated, immediately when skin becomes wet, and at the end of each work shift
Promptly upon contam	Promptly when skin becomes contaminated
Promptly upon con- tam/daily	Promptly when skin becomes contaminated and at the end of each work shift
Promptly upon wet	Promptly when skin becomes wet

pH < 3 immed contam/pH ≥ or 3 pro wet.....	Immediately when skin becomes contaminated with liquid of pH < 3, and promptly when skin becomes wet with liquid of pH ≥ 3
Soap wash promptly.....	Promptly wash with soap when skin becomes contaminated
<i>CHANGE</i>	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 may be contam	If it is reasonably probable that the clothing is contaminated
<i>REMOVE</i>	Remove clothing:
Any contam immed	Immediately remove any clothing that becomes contaminated
Any wet immed	Immediately remove any clothing that becomes wet
Any wet immed (flamm)	Immediately remove any clothing that becomes wet to avoid flammability hazard

Table 2
PERSONAL PROTECTION AND
SANITATION CODES (Continued)

Any wet/contam non- imperv immed	Immediately remove any clothing that becomes wet and any non-impervious clothing that becomes contaminated
Immed any wet/contam non-imperv	Immediately remove any clothing
Immed contam non- imperv	Immediately remove non-impervious clothing that becomes contaminated
Immed wet/ pro contam non-imperv	Immediately remove any non-impervious clothing that becomes wet, and promptly remove any non-impervious clothing that becomes contaminated
Promptly contam non-imperv	Promptly remove non-impervious clothing that becomes contaminated.

Promptly contam/ immed wet non-imperv	Promptly remove non-impervious clothing that becomes contaminated and immediately remove non-impervious clothing that becomes wet
Promptly wet non- imperv	Promptly remove non-impervious clothing that becomes wet
Non-imperv > x% im- med/y% pro	Immediately remove non-impervious clothing that becomes contaminated with liquids containing > x% contaminant, and promptly remove clothing contaminated with y%
<i>PROVIDE</i>	The following equipment should be available:
Eyewash	Self-explanatory
Eyewash, quick drench	Self-explanatory
Eyewash (xxx)	Eyewash if substance xxx is present
≥ 5% eyewash	Eyewash if liquids containing ≥ 5% contaminant is present

Table 2
PERSONAL PROTECTION AND
SANITATION CODES (Continued)

OTHER CODES

Liq	Liquid
Molt	Molten
N.A.	No recommendation applies in this category
Sol	Solid
Soln	Solutions containing the contaminant
Vap	Vapor

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES

Footnotes

-
- End of Service Life Indicator required
 - ‡ When respirators are to be used
 - * Substance reported to cause eye irritation or damage; may require eye protection
 - δ If not present as fume
 - Σ Only non-oxidizable sorbents are allowed (not charcoal)
 - Ξ At any detectable concentration
 - ψ Substance causes eye irritation or damage; eye protection needed
 - Ω Emergency or planned entry in unknown concentration or IDLH conditions

Code Components

-
- CCR Chemical cartridge respirator
 - D Dust respirator/filter

- Fu Fume filter
- GM Air purifying respirator (Gas Mask) (front- or back-mounted or chin-style 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
- F Full facepiece
- HIE High-efficiency particulate filter
- OV Organic vapor cartridge or canister
- PD,PP Pressure demand or other positive pressure
- 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

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

24	<p>CCRAGFHIE Any chemical cartridge respirator with a full facepiece and acid gas cartridge(s) in combination with a high-efficiency particulate filter</p> <p>CCRAGHIE..... Any chemical cartridge respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter</p> <p>CCRFOV..... Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)</p> <p>CCRFOVHIE Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter</p> <p>CCROV..... Any chemical cartridge respirator with organic vapor cartridge(s)</p>	<p>CCROVAG Any chemical cartridge respirator with organic vapor and acid gas cartridge(s)</p> <p>CCROVAGF Any chemical cartridge respirator with a full facepiece and organic vapor and acid gas cartridge(s)</p> <p>CCROVDM Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter</p> <p>CCROVDMF..... Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a dust and mist filter</p> <p>CCROVDMFu Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter</p> <p>CCROVFD Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a dust filter</p>
----	---	---

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

CCROVDMFu Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a dust, mist, and fume filter

CCROVHiE Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a high-efficiency particulate filter

CCRS Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern

CCRSF Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern

D Any dust respirator

DF Any dust respirator with a full facepiece

DFAG Any dust respirator with a full facepiece and acid gas cartridge(s) or canister

DM Any dust and mist respirator

DMF Any dust and mist respirator with a full facepiece

DMFu Any dust, mist, and fume respirator

DMFuF Any dust, mist, and fume respirator with a full facepiece

DMXS Any dust and mist respirator except single-use respirators

DMXSQ Any dust and mist respirator except single-use and quarter-mask respirators

DXSQ Any dust respirator except single-use and quarter-mask respirators

GMFAG Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted acid gas canister

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

GMFHiEAG Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted acid gas canister having a high-efficiency particulate filter

GMFHiEOV Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister having a high-efficiency particulate filter

GMFHiEOVAG Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor and acid gas canister having a high-efficiency particulate filter

GMFOV Any air-purifying full facepiece respirator (gas mask) with a

chin-style or front- or back-mounted organic vapor canister

GMFOVAG Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor and acid gas canister

GMFOVDM Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister in combination with a dust and mist filter

GMFOVS Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted organic vapor canister that also provides protection against the compound of concern

GMFS Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted canister providing protection against the compound of concern

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

GMFSHIE Any air-purifying full facepiece respirator (gas mask) with a chin-style or front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter

HiE Any air-purifying respirator with a high-efficiency particulate filter

HiEF Any air-purifying full facepiece respirator with a high-efficiency particulate filter

HiEFAG Any air-purifying full facepiece respirator with a high-efficiency particulate filter and acid gas cartridge(s)

HiEFS Any air-purifying full facepiece respirator with cartridge(s) providing protection against the compound of concern and

having a high-efficiency particulate filter

PAPRAG Any powered air-purifying respirator with an acid gas cartridge(s)

PAPRDM Any powered air-purifying respirator with a dust and mist filter

PAPRDMAG Any powered air-purifying respirator with a dust and mist filter in combination with acid gas cartridge(s)

PAPRDMFu Any powered air-purifying respirator with a dust, mist, and fume filter

PAPRHIE Any powered air-purifying respirator with a high-efficiency particulate filter

PAPROV Any powered air-purifying respirator with organic vapor cartridge(s)

PAPROVAG Any powered air-purifying respirator with organic vapor and acid gas cartridge(s)

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

PAPROVDM Any powered air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter

PAPROVDMFu Any powered air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter.

PAPRS Any powered air-purifying respirator with cartridge(s) providing protection against the compound of concern

PAPRTHiE Any powered air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

PAPRTOV Any powered air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)

PAPRTOVHiE Any powered air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter

PAPRTS Any powered air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern

SA Any supplied-air respirator

SAF Any supplied-air respirator with a full facepiece

SAF:PD,PP Any supplied-air respirator with a full facepiece and operated in a pressure-demand or other positive pressure mode

SAF:PD,PP:ASCBA Any supplied-air respirator with a full facepiece and operated in 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

Table 3
RESPIRATOR FOOTNOTES,
CODE COMPONENTS, AND CODES (Continued)
Codes

SA:CF	Any supplied-air respirator operated in a continuous flow mode
SA:PD,PP	Any supplied-air respirator with a half-mask and operated in a pressure-demand or other positive pressure mode
SAT:CF	Any supplied-air respirator with a tight-fitting facepiece operated in a continuous flow mode
SCBA	Any self-contained breathing apparatus
SCBAE	Any appropriate escape-type self-contained breathing apparatus
SCBAF	Any self-contained breathing apparatus with a full facepiece
SCBAF:PD,PP	Any self-contained breathing apparatus with full facepiece and operated in a pressure-demand or other positive pressure mode

Table 4
ABBREVIATIONS FOR SYMPTOMS
OF EXPOSURE

abdom	abdominal
album	albuminuria
anem	anemia
anes	anesthesia
anor	anorexia
anos	anosmia
ANS	autonomic nervous system
apat	apathy
appre	apprehension
arrhy	arrhythmias
asphy	asphyxia
asth	asthma
atax	ataxia
biliru	billirubinuria
blur	blurred
breath	breathing
bron	bronchitis
bronspas	broncospasm

BUN	blood urea nitrogen
ca	cancer
cachexia	severe generalized weakness, emaciation
carc	carcinogenic/carcinogen
card	cardiac
cere	cerebral
chol	cholinesterase
chor	chorea
cirr	cirrhosis
CNS	central nervous system
coll	collapse
conf	confusion
conj	conjunctivitis
constip	constipation
constric	constriction
convuls	convulsions
cor pul- monale	acute right heart strain or chronic right ventricular hypertrophy
corn	cornea
CVS	cardiovascular system
cyan	cyanosis
defat	defatting

Table 4
ABBREVIATIONS FOR SYMPTOMS
OF EXPOSURE (Continued)

deg degeneration
dent dental
depres depressant/depression
derm dermatitis
diarr diarrhea
dil dilated
dist disturbance
dizz dizziness
drow drowsiness
dys dysuria
dysp dyspnea
dysart dysarthria
ecz eczema
emphy emphysema
enl enlargement
eosin eosinophilia
epis epistaxis
epit epithellum

equi equilibrium
ery chol erythrocyte cholinesterase
eryt erythema
euph euphoria
extrem extremities
fasc fasciculation
fib fibrosis
fibri fibrillation
frost frostbite
ftg fatigue
fvr fever
gaap gasping
GI gastrointestinal
gidd giddiness
glau glaucoma
glu glucose
halu hallucinations
head headache
hema hematuria
hemat hematoma
hemato hematopoietic
hemog hemoglobinuria
hemorr hemorrhage

Table 4
ABBREVIATIONS FOR SYMPTOMS
OF EXPOSURE (Continued)

hep hepatic
 hyper hyperemia
 hypox hypoxemia
 ict icterus
 Inco Incoordination
 Inflamm inflammation
 inj Injury
 insom insomnia
 intox intoxication
 irrit irritation
 irrity irritability
 jaun jaundice
 kera keratitis
 kid kidney
 lab labored
 lac lacrimation
 lar laryngeal
 lass lassitude

leucyt leukocytosis
 leuk leukemia
 leupen leukopenia
 li-head lightheadedness
 liv liver
 lo-ap appetite loss
 low-wgt weight loss
 lymph lymphocytosis
 mal malaise
 mainut malnutrition
 monocy monocytosis
 muc memb mucous membrane
 musc muscle
 myo myotonia
 narc narcotic
 narco narcosis
 nas nose/nasal
 nau nausea
 nec necrosis
 neph nephritis
 ner nervousness
 neur neurologic

Table 4
ABBREVIATIONS FOR SYMPTOMS
OF EXPOSURE (Continued)

numb	numbness
opac	opacity
pal	pallor
palp	palpitations
para	paralysis
pares	paresthesia
paresis	incomplete loss of muscular power; weakness of a limb
parox	paroxysm
perf	perforation
peri neur	peripheral neuropathy
peri neurit	peripheral neuritis
periorb	periorbital
phar	pharyngeal
photo	photophobia
pig	pigmentation
plas	plasma
pleur	pleurisy

pne	pneumonia
pneuitis	pneumonitis
PNS	peripheral nervous system
polyneur	polyneuropathy
pros	prostration
prot	proteinuria
pyspec	psychialopecia
pulm	pulmonary
pulsus	a pulse pattern in which beats occur at
altenans.	regular intervals, but with alternating
	weak and strong beats
pup	pupil
RBC	red blood cell
resp	respiratory
resp ar	respiratory arrest
retster	retrosternal
rhin	rhinorrhea
salv	salivation
scotoma	an area of absent or depressed vision in
	the visual field
sens	sensitization
sez	seizure
sleep	sleepiness

Table 4
ABBREVIATIONS FOR SYMPTOMS
OF EXPOSURE (Continued)

sneez	.....sneezing	vomit	.....vomiting
som	.....somnolence	weak	.....weakness
spas	.....spasm	wheez	.....wheezing
strabismus	...abnormality of the eyes in which the visual axes do not meet at the desired point		
subs	.....substernal		
sweat	.....sweating		
swell	.....swelling		
tacar	.....tachycardia		
temp	.....temperature		
tend	.....tenderness		
trachbronc	...tracheobronchitis		
vasconst	...vasoconstriction		
venfib	.....ventricular fibrillation		
verti	.....vertigo		
vesic	.....vesiculation		
vis dist	.....visual disturbance		

Table 5
CODES FOR FIRST AID DATA

EYE

Irr immed If this chemical comes in contact with 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 comes in contact with 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 promptly If this chemical comes in contact with 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 comes in contact with the skin, dust it off immediately and then flush the contaminated skin with water. If this chemical or liquids containing this chemical penetrate through the clothing, promptly remove the clothing and flush the skin with water. Get medical attention immediately.

Medical attention for frostbite If this chemical comes in contact with the skin or mouth, stop the exposure immediately. If frostbite has occurred, get medical attention.

Table 5
CODES FOR FIRST AID DATA (Continued)

Molten: flush
 immed; sol/
 liq wash

If this molten chemical comes in contact with the skin, immediately flush the skin with large amounts of water. Get medical attention immediately. If this chemical or liquids containing this chemical contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical or liquids containing this chemical penetrate through the clothing, immediately remove the clothing and wash the skin with soap and water. If irritation persists after washing, get medical attention.

Petro product
 rinse

If this liquid chemical or strong concentrations of this chemical's vapors comes in contact with the skin, immediately rinse the contaminated skin with kerosene or similar petroleum products, if readily available, then wash the

Soap flush
 immed

If this chemical comes in contact with the skin, immediately flush the contaminated skin with soap and water. If this chemical penetrates through the clothing, immediately remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention.

Soap flush
 promptly

If this chemical comes in contact with the skin, promptly flush the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and flush the skin with water. If irritation

Table 5
CODES FOR FIRST AID DATA (Continued)

					penetrates through the clothing, immediately remove the clothing, wash the skin with soap and water, get medical attention promptly.
Soap promptly/ flush immed molten		persists after washing, get medical attention.		Soap wash promptly	If this chemical comes in contact with the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly.
	If this solid chemical or liquids containing this chemical comes in contact with 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 non-impervious clothing, immediately flush the affected area with large amounts of water to remove heat. Get medical attention immediately.			Water flush immed	If this chemical comes in contact with 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.
Soap wash	If this chemical comes in contact with the skin, wash, the contaminated skin with soap and water.			Water flush promptly	If this chemical comes in contact with the skin, flush the contaminated skin with water promptly. If this chemical penetrates the clothing, immediately remove the clothing
Soap wash immed	If this chemical comes in contact with the skin, immediately wash the contaminated skin with soap and water. If this chemical				

Table 5
CODES FOR FIRST AID DATA (Continued)

		and flush the skin with water promptly. If irritation persists after washing, get medical attention.	
Water wash immed	If this chemical comes in contact with 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 promptly	If this chemical comes in contact with the skin, promptly wash the contaminated skin with water. If this chemical penetrates the clothing, promptly remove the clothing and wash the skin with water. If irritation persists after washing, get medical attention.		
			BREATH
			Art resp
			If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.
			Fresh air
			If a person breathes in 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 in 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.

Table 5
CODES FOR FIRST AID DATA (Continued)

SWALLOW

Medical attention immed	If this chemical has been swallowed, get medical attention immediately.
Milk, if N.A., water, NO VOMIT	If this liquid chemical has been swallowed and the person is conscious, immediately give the person large quantities of milk to dilute the chemical. Do not attempt to make the person vomit. Get medical attention immediately. (If milk is not immediately available, give the person water instead of milk.)
NO VOMIT	If this chemical has been swallowed, do not induce vomiting. Get medical attention immediately.
Syrup of Ipecac ...	If this chemical has been swallowed, immediately get medical attention. If medical attention is not immediately available, get

the affected person to vomit by having the person touch the back of the throat with a finger or give the person syrup of ipecac as directed on the package. This non-prescription drug should be kept with emergency medical supplies in the workplace and is available at most drug stores or counters. Do not make an unconscious person vomit.

USE AMYL NITRITE PEARLS (ampules)

Water, NO VOMIT

If this chemical has been inhaled, comes in contact with the skin, or has been swallowed, immediately administer amyl nitrite as directed on the package.

If this chemical has been swallowed and the person is conscious, immediately give the person large quantities of water to dilute the chemical. Do not attempt to make the person vomit. Get medical attention immediately.

Table 5
CODES FOR FIRST AID DATA (Continued)

Water, vomit If this chemical has been swallowed and the person is conscious, immediately give the person large quantities of water. After the water has been swallowed, try to get the person to vomit by having the person touch the back of their throat with a finger. Do not make an unconscious person vomit. Get medical attention immediately.

40

Water, vomit; if petroleum base, NO VOMIT If this chemical has been swallowed, immediately get medical attention. If the swallowed chemical was dissolved in a petroleum-based material, do not make the exposed person vomit. If medical attention is not immediately available and the swallowed chemical was a powder or was in a water base

get the person to vomit by having the person touch the back of their throat with a finger or give the person large amounts (one pint or more) of warm salt water (two tablespoons of salt per pint of water). Do not make an unconscious person vomit.

CHEMICAL LISTING

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Acetaldehyde CH ₃ CHO 75-07-0 AB1925000 1089 28	Ethanal, Acetic aldehyde	200 ppm (360 mg/m ³) (ACGIH) 100 ppm (180 mg/m ³)	10,000 ppm	Colorless liquid or gas with a penetrating, fruity odor	MW: 44 BP: 69°F Sol: Miscible Fl.P: -38°F IP: 10.21 eV	VP: 750 mm MP: -163°F UEL: 80% LEL: 4%	Strong oxidizers, acids, bases, alcohol, ammonia, amines, phenols, ketones, HCN, hydrogen sulfide	NIOSH 79-141
Acetic acid CH ₃ COOH 64-19-7 AF1225000 2789 29	Glacial acetic acid, Methane carboxylic acid, Ethanoic acid, Vinegar acid	10 ppm (25 mg/m ³)	1000 ppm	Colorless liquid or solid with a strong vinegar-like odor	MW: 60 BP: 244°F Sol: Miscible Fl.P: 104°F IP: 10.37 eV	VP: 11 mm MP: 62°F UEL: 16% LEL: 5.4%	Strong oxidizers, chromic acid, sodium peroxide, nitric acid, strong caustics	Char; HCOOH; GC; III
Acetic anhydride (CH ₃ CO) ₂ O 108-24-7 AK1925000 1715 39	Ethanoic anhydride, Acetic acid anhydride, Acetyl oxide	5 ppm (20 mg/m ³)	1000 ppm	Colorless liquid with a characteristic sharp odor	MW: 102 BP: 284°F Sol: 12% Fl.P: 120°F	VP: 4 mm MP: -99°F UEL: 10.3% LEL: 2.9%	Water, alcohols, strong oxidizers, chromic acid, amines, strong caustics	Bub(hydroxylamine); FeCl ₃ ; color; I
Acetone CH ₃ COCH ₃ 67-64-1 AL3150000 1090 28	2-Propanone, Dimethyl ketone, Ketone propane	1000 ppm (2400 mg/m ³) (NIOSH) 250 ppm (590 mg/m ³) 10-hr TWA (ACGIH) 750 ppm	20,000 ppm	Colorless liquid with a fragrant, mint-like odor	MW: 58 BP: 133°F Sol: Miscible Fl.P: 1.4°F IP: 9.89 eV	VP(77°F): 266 mm MP: -189°F UEL: 12.8% LEL: 2.8%	Oxidizing materials, acids	Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash	AGGIH 1000 ppm: PAPROV*CCRFOV 2500 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP Q: 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 edem	Eye: Skin: Breath: Swallow:	Irr immed Water, flush promptly Art resp Medical attention immed	Resp sys, skin, kidneys
Clothing: > 50% AP/10-49% RP Goggles: Any poss Wash: Contam > 50% immv 10-49% pro Change: N.A. Remove: Contam > 50% immv 10-49% pro Provide: > 5% eyewash > 50% drench	OSHA 250 ppm: SA:CF*/PAPROV* 500 ppm: CCRFOV/SCBAF/SAF/ GMFOV/PAPRTOV* 1000 ppm: SAF:PD,PP Q: 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; dent erosion; black skin, hyperkeratosis	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Art resp Medical attention immed	Resp sys, skin, eyes, teeth
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 125 ppm: SA:CF*/PAPROV* 250 ppm: CCRFOV/SCBAF/SAF/ GMFOV/PAPRTOV* 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Conj lac, corn edema, opac, photophobia, nas phar irrit, cough, dysp bron; skin burns, vesic, derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Art resp Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: CCROV/PAPROV/SA/SCBA 6250 ppm: SA:CF* 12,500 ppm: GMFOV/SAF/SCBAF 20,000 ppm: SAF:PD,PP Q: 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 immed Art resp Medical attention immed	Resp sys, skin

Acetone

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Acetonitrile CH ₃ CN 75-05-8 AL7700000 1648 28	Methycyanide	40 ppm (70 mg/m ³) (NIOSH) 20 ppm (34 mg/m ³) 10-hr TWA	4000 ppm	Colorless liquid with an ether-like odor	MW: 41 BP: 179°F Sol: Miscible F.P.: 42°F IP: 12.22 eV	VP: 73 mm MP: -50°F UEL: 16% LEL: 4.4%	Strong oxidizers Char; C ₆ H ₆ ; GC; III
2-Acetylamino-fluorene C ₁₃ H ₁₁ NO 53-98-3 AB9450000 820017	2-Acetamidofluorene, 2-AAF, AAF, 2-Acetaminofluorene, N-Acetyl-2-amino-fluorene, FAA, 2-FAA, 2-Fluorenylacetylamide, N-2-Fluorenylacetylamide, N-Fluoren-2-acetylacetylamide, N-Fluorenyl-2-acetylamide	See Appendix C (NIOSH)	Ca	Tan, crystalline solid	MW: 223 BP: ? Sol: Insoluble F.P.: ?	VP: ? MP: 381°F UEL: ? LEL: ?	Not available —
Acetylene tetrabromide CHBr ₂ CHBr ₂ 79-27-6 KI8225000 2504 58	Tetrabromoethane; Symmetrical tetrabromoethane; 1,1,2,2-Tetrabromoethane	1 ppm (14 mg/m ³)	10 ppm	Pale yellow liquid with a pungent odor	MW: 346 BP: 482°F Sol: 0.07% Not combustible	VP: < 0.1 mm MP: 30°F	Chemically active metals, strong caustics, hot iron, aluminum, zinc in presence of steam SiO ₂ ; THF; GC; L
Acrolein CH ₂ CHCHO 107-02-8 AS1050000 1092 30	Acrylic aldehyde, Acrylaldehyde, Propenal, Allylaldehyde	0.1 ppm (0.25 mg/m ³)	5 ppm	Clear colorless or yellowish liquid with a piercing, disagreeable odor, causes tears	MW: 56 BP: 125°F Sol: 22% F.P.: -15°F IP: 10.10 eV	VP: 214 mm MP: -125°F UEL: 31% LEL: 2.8%	Oxidizers, acids, alkalis, ammonia Ads; toluene; GC; III

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
			Route	Symptoms (See Table 4)	First Aid (See Table 5)		Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet Immed (flamm) Provide: Quick drench	OSHA 400 ppm: CCRFOV/SA/SCBA 1000 ppm: SA:CF/PAPROV/CCRFOV 2000 ppm: GMFOV/SCBAF/SAF 4000 ppm: SA:PD,PP ⁺ Q: SCBAF: PD,PP ⁺ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Abs Con	Asphy; nau, vomit; chest pain; weak; stupor, convuls; eye irrit	Eye: Irr Skin: Immed Breath: Water flush Art resp Swallow: Medical attention Immed	Kidneys, liver, CVS, CNS, lungs, skin, eyes		
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam Immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP ⁺ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Reduced function of liv, kid, bladder, pancreas	Eye: Irr Skin: Immed Breath: Soap wash Art resp Swallow: Medical attention Immed	Liver, bladder, kidney, pancreas, skin, lungs		
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam nonimperv	OSHA 10 ppm: SA/SCBA Q: SCBAF:PD,PP ⁺ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; anor, nau; severs head; abdom pain; jaun; monocy	Eye: Irr Skin: Immed Breath: Water flush Art resp Swallow: Medical attention Immed	Eyes, upper resp sys, liver		
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet Immed (flamm) Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA:CF ⁺ /PAPROV ⁺ 5 ppm: CCRFOV/GMFOV/SCBAF/SAF Q: SCBAF:PD,PP ⁺ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; abnormal pulm func; delayed pulm edema, chronic resp disease	Eye: Irr Skin: Immed Breath: Water flush Art resp Swallow: Medical attention Immed	Heart, eyes, skin, resp sys		

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Acrylamide CH ₂ CHCONH ₂ 79-06-1 AS3325000 2074 55	Propenamida, Acrylamide monomer, Acylic amide	0.3 mg/m ³ (NIOSH) 0.3 mg/m ³ 10-hr TWA	N.A.	Colorless solid	MW: 71 BP: Decomposes Sol: 216% F.I.P.: ?	VP: 0.007 mm MP: 183°F UEL: ? LEL: ?	Strong oxidizers --
Acrylonitrile CH ₂ CHCN 107-13-1 AT5250000 1093 30	Propenenitrile, An, Vinyl cyanide	2 ppm 10 ppm cell 15 min (NIOSH) 1 ppm 8-hr TWA 10 ppm 15-min cell See Appendix A (ACGIH) 2 ppm, A2	Ca	Colorless to pale yellow liquid with a pungent odor	MW: 53 BP: 171°F Sol: 7.1% F.I.P.: 30°F IP: 10.91 eV	VP: 83 mm MP: -117°F UEL: 17% LEL: 3%	Strong oxidizers (especially bromine), strong bases, copper, copper alloys, ammonia, amines Char; ac; GC; K
Aldrin C ₁₂ H ₈ Cl ₄ 309-00-2 IO2100000 2781 55	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo, exo-1,4,5,8-dimethanonaphthalene; Octalene	0.25 mg/m ³ (NIOSH) Lowest detectable limit (0.15 mg/m ³ TWA by NIOSH-validated method) See Appendix A	Ca	Tan to dark brown solid with a mild chemical odor	MW: 365 BP: Decomposes Sol: Insoluble Not combustible	VP: 6 x 10 ⁻⁴ mm MP: 220°F	None hazardous Fill/bub (osp-octane); iso-octane; GC; III
Allyl alcohol CH ₂ CHCH ₂ OH 107-18-6 BA5075000 1098 28	2-Propenol, 2-Propen-1-ol, Vinyl carbinol	2 ppm (5 mg/m ³)	150 ppm	Colorless liquid with an odor like mustard	MW: 58 BP: 206°F Sol: Miscible	VP: 17 mm MP: -200°F UEL: 18% LEL: 2.5%	Strong oxidizers Char; 2-Propanol in SC ₂ ; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Quick drench	NIOSH 3 mg/m ³ : SA ⁺ /SCBA ⁺ 7.5 mg/m ³ : SA:CF ⁺ 15 mg/m ³ : SAF/SCBAF 600 mg/m ³ : SAF:PD, PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Atax; numb limbs, pares; musc weak; absent deep tendon reflex; hand sweat; fig; lethargy; irrit eyes, skin	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention Immed	CNS, PNS, skin, eyes
Clothing: Repeat prolong Goggles: Any prob Wash: Immed upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Asphy; irrit eyes; head; sneez; nau, vomit; weak, ill-head; skin vesic, scal- ing derm; [carc]	Eye: Irr immed Skin: Water wash immed Breath: Art resp/aml nitrite Swallow: Medical attention immed	CVS, liver, kidneys, CNS, skin, brain tumor, lung and bowel cancer
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	NIOSH E: 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 con- vuls; coma; hema, azotemia; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention Immed	Cancer, CNS, liver, kidneys, skin
Clothing: AP liq/RP vap >25 ppm Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	OSHA 50 ppm: SA:CF ⁺ /PAPROV ⁺ 100 ppm: CCRFOV/GMFOV/SCBAF/SAF PAPROV ⁺ 150 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing	Eye irrit, tissue damage, burns; irrit upper resp, skin; pulm edema	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Allyl chloride <chem>CH2CHCH2Cl</chem> 107-05-1 UC7350000 1100 28	3-Chloropropene, 1-Chloro-2-propene	1 ppm (3 mg/m ³) (NIOSH) 1 ppm (3.1 mg/m ³) 10-hr TWA 3 ppm (9.3 mg/m ³) 15-min ceil	300 ppm	Colorless, yellow, or purple liquid with an unpleasant, pungent odor	MW: 77 BP: 112°F Sol: 0.4% Fl.P.: -25°F	VP: 295 mm MP: -209°F UEL: 11% LEL: 3.3%	Strong oxidizers, acids, aluminum, zinc, amines, peroxides, chlorides of iron and aluminum Char; CaH ₂ ; GC; III
Allyl glycidyl ether <chem>C6H10O2</chem> 106-92-3 RR0875000 2219 29	AGE; 1-Allyloxy-2,3-epoxy-propane	10 ppm ceil (45 mg/m ³) (NIOSH) 9.6 ppm (45 mg/m ³) 15-min ceil (ACGIH) 5 ppm	270 ppm	Colorless liquid with a strong odor	MW: 114 BP: 309°F Sol: 14% Fl.P.: 135°F	VP: 2 mm MP: -148°F UEL: ? LEL: ?	Strong oxidizers Tenax; ethyl ether; GC; Set 2
4-Aminodiphenyl <chem>C12H11N</chem> 92-67-1 DU8925000	p-Aminobiphenyl; Biphenylamine; (1,1-Biphenyl)-4-amine; p-Phenylamine; Xenylamine; 4-Aminobiphenyl; p-Aminobiphenyl; p-Biphenylamine; Paraminodiphenyl; 4-Biphenylamine	See Appendix C (NIOSH) (ACGIH) A1b	Ca	Colorless crystals which turn purple on contact with air; floral odor	MW: 169 BP: 575°F Sol: Slightly Fl.P.: 307°F	VP: ? MP: 127°F UEL: ? LEL: ?	None NIOSH 77-157A
2-Aminopyridine <chem>C5H6N2</chem> 504-29-0 US1575000 2671 55	alpha-Aminopyridine	0.5 ppm (2 mg/m ³)	5 ppm	Colorless solid with a characteristic odor	MW: 94 BP: 410°F Sol: >100% Fl.P.: 154°F	VP: Low MP: 133°F UEL: ? LEL: ?	Strong oxidizers Tenax thermal desorp; GC; Set 4

Health Hazards

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	NIOSH 25 ppm: SA/CF* 50 ppm: SCBAF/SAF 300 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, skin; pulm edema; lung, liver, kidney damage; deep musc ache; deep bone ache	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes, liver, kidneys
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Promptly upon contam non-imperv Provide: Eyewash	NIOSH 98 ppm: SA/SCBA/CCROV 240 ppm: SA/CF*/PAPROV* 270 ppm: SCBAF/SAF/PAPRTOV*/ GMFOV/CCRFOV Q: SCBAF/PD,PP/ SAF/PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Derm; eye, nose irrit; pulm irrit, edema; narcos	Eye: Irr immed Skin: Water flush Breath: Art resp Swallow: Medical attention immed	Resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH Q: SCBAF/PD,PP/ SAF/PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, lethargy, dizz, dysp, ataxia, weak, methemoglobinemia, urinary burning, acute hemorrhage cystitis, [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Bladder, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Quick drench	OSHA 5 ppm: SA*/SCBA* Q: SCBAF/PD,PP/ SAF/PD,PP-ASCBA Escape:GMFHIOV/SCBAE	Inh Abs Ing Con	Head, dizz; nau; high BP; resp distress; weak; con- vuls; stupor	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	CNS, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ammonia NH ₃ 7664-41-7 BO0875000 1005 15	Anhydrous ammonia	50 ppm (35 mg/m ³) (NIOSH) 50 ppm 5-min ceil (35 mg/m ³) (ACGIH) 25 ppm	500 ppm	Colorless gas with a penetrating, pungent, suffocating odor; can be a liquid when under pressure	MW: 17 BP: -28°F Sol: 51% F.L.P.: N.A. IP: 10.15 eV	VP: >1 atm MP: -108°F UEL: 25% LEL: 16%	Strong oxidizers, calcium, hypochlorite bleaches, gold, mercury, silver, halogens SiO ₂ -H ₂ SO ₄ ; ISE; Set 6
Ammonium sulfamate NH ₂ SO ₂ NH ₂ 7773-06-0 WO6125000 9089 31	Ammate herbicide	15 mg/m ³ (ACGIH) 10 mg/m ³	5000 mg/m ³	Colorless, odorless solid	MW: 114 BP: 392°F Sol: 200% Not combustible	VP: 40 mm MP: 268°F	Strong oxidizers, hot water NIOSH 79-141
n-Amyl acetate CH ₃ COOC ₅ H ₁₁ 628-63-7 AJ1925000 1104 26	1-Pentanol acetate, n-Amyl acetate (mixed isomers)	100 ppm (525 mg/m ³)	4000 ppm	Colorless liquid with a banana oil odor	MW: 130 BP: 295°F Sol: 0.2% F.L.P.: 77°F	VP: 4 mm MP: -95°F UEL: 7.5% LEL: 1.1%	Nitrates; strong oxidizers, alkalis, and acids Char; CS ₂ ; GC; III
sec-Amyl acetate C ₇ H ₁₄ O ₂ 628-38-0 AJ2100000 1104 26	2-Pentanol acetate	125 ppm (650 mg/m ³)	9000 ppm	Clear, colorless liquid with a fruity odor	MW: 130 BP: 273°F Sol: 0.2% F.L.P.: 89°F	VP: 7 mm MP: -148°F UEL: ? LEL: 1%	Nitrates; strong oxidizers, alkalis, and acids Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: > 10% AP/K 10% RP Goggles: > 10% AP/K RP Wash: > 10% imm con/ < 10% pro wet Change: N.A. Remove: Non-imp con > 10% imm/ < 10% Provide: Eyewash and drench > 10%	NIOSH 300 ppm: CCRS* 500 ppm: SA-PAPRS* GMFS/SCBA* Q: 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: Art resp Swallow: Medical attention immed	Resp sys, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 50 mg/m ³ : DM 100 mg/m ³ : DMXSQ/SA 250 mg/m ³ : PAPRDM/SA:CF 500 mg/m ³ : HIEF/PAPRTHIE/ SAT:CF/SCBAF/SAF 5000 mg/m ³ : SA:PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	None known in humans	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	None known
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV*CCROV* SA*/SCBA* 2500 ppm: SA:CF* 4000 ppm: GMFOV/SCBAF/SAF Q: SCBAF,PD,PP/ SAF,PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; narcosis; derm	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV*CCROV* 1250 ppm: SA*/SCBA* 3125 ppm: SA:CF* 6250 ppm: GMFOV/SCBAF/SAF 9000 ppm: SAF,PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; narcosis; derm	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Aniline $C_6H_5NH_2$ 62-53-3 BW6650000 1547 57	Aminobenzene, Phenylamine, Aniline oil	5 ppm (19 mg/m ³) (ACGIH) 2 ppm (10 mg/m ³)	100 ppm	Colorless to brown, oily liquid with a weak amine odor	MW: 93 BP: 364°F Sol: 3.5% F.P.: 158°F IP: 7.70 eV	VP: 0.6 mm MP: 21°F UEL: ? LEL: 1.3%	Strong acids and oxidizers SiO ₂ , CH ₃ CH ₂ OH, GC, K
Anisidine (o-, p-isomers) $NH_2C_6H_4OCH_3$ 104-94-9 (p-anisidine) B25450000 2431 55	o-Methoxyaniline, p-Methoxyaniline	0.5 mg/m ³ (ACGIH) 0.1 ppm (0.5 mg/m ³)	50 mg/m ³	Ortho: colorless to pink liquid with a characteristic amine odor; Para: light red-brown solid with a characteristic amine odor	MW: 123 BP: 436/470°F Sol: 1.3% F.P.: 86°F para	VP: < 0.1 mm MP: 43/137°F UEL: ? LEL: ?	Strong oxidizers NIOSH 77-157A
Antimony and compounds (as Sb) Sb 7440-38-0 CC4025000 2871 53	Synonyms vary depending upon specific compound	0.5 mg/m ³ (NIOSH) 0.5 mg/m ³ 10-hr TWA	80 mg/m ³	Silvery-white solid	MW: 122 BP: 2516°F Sol: insoluble F.P.: ?	VP: ≈ 0 mm MP: 1202°F UEL: ? LEL: ?	Oxidizers, acids, halogenated acids Filter: acid; AA; A
ANTU $C_{10}H_{11}N_3S$ 86-88-4 YT9275000 1851 53	alpha-Naphthyl thiourea, alpha-Naphthyl thiocarbamide, n-1-Naphthyl-thiourea, 1-(1-Naphthyl)-2-thiourea	0.3 mg/m ³	100 mg/m ³	Colorless, odorless solid	MW: 202 BP: Decomposes Sol: 0.06% F.P.: ?	VP: ≈ 0 mm MP: 368°F UEL: ? LEL: ?	Strong oxidizers NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	ACGIH 20 ppm: CCROV*/SA*/SCBA* 50 ppm: SA:CF*/PAPROV* 100 ppm: CCRFOV/GMFOV/SCBAF/SAF/PAPRTOV Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; weak, dizz; cyan; atax; dysp on effort; tacer; eye irrit	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Blood, CVS, liver, kidneys
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Quick drench	OSHA 2.5 mg/m ³ : DMXS 5 mg/m ³ : DMXSQ/SA/SCBA 12.5 mg/m ³ : PAPRDM/SA:CF 25 mg/m ³ : SAF/SCBAF/HIEF/PAPRTHIE* 50 mg/m ³ : SA:PD,PP* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, dizz; cyan; RBC Heinz bodies	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, kidneys, liver, CVS
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH 5 mg/m ³ : DMXSQ*SA/SCBA 12.5 mg/m ³ : PAPRDM/SA:CF 25 mg/m ³ : HIEF/PAPRTHIE/ SAT:CF/SCBAF/SAF 80 mg/m ³ : SA,PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE/HIEF	Inh Con	Irrit nose, throat, mouth; cough; dizz; head; nau, vomit, diar; cramps; in-som; anor; irrit skin; unable to smell; cardiac	Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: After work it may be contam Remove: N.A.	OSHA 3 mg/m ³ : CCROVDMFu/SA/SCBA 7.5 mg/m ³ : PAPROVDMFu/SA:CF 15 mg/m ³ : CCRFOVHIE/PAPRTOVHIE SAT: CF/SCBAF/SAF/GMFOVHIE 100 mg/m ³ : SA,PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing	Vomit; dysp; cyan; coarse pulm, rales after ingestion of large doses	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Arsenic and compounds (see Aa) Aa 7740-38-2 CG0525000 1558 53	Synonyms vary depending upon specific compound	10 µg/m ³ (NIOSH) 2 µg/m ³ 15-min cell See Appendix A	Ca	Appearance and odor vary	Properties vary depending upon specific compound	Not applicable	NIOSH 77-157A
Arsine AsH ₃ 7784-42-1 CG6475000 2188 18	Hydrogen arsenide, Arsenic trihydride	0.05 ppm (0.2 mg/m ³) (NIOSH) 2 µg/m ³ 15-min cell See Appendix A	Ca	Colorless gas with a garlic-like odor	MW: 78 BP: -60.5°F Sol: 0.07% Not combustible IP: 10.03 eV	VP: >1 atm MP: -177°F Strong oxidizers, chlorine, nitric acid	Char; HNO ₃ ; HGA; O
Asbestos 1332-21-4 C16475000 2212 31 2590 31	Chrysotile, Amosite, Crocidolite, Tremolite, Anthophyllite, Actinolite	See Appendix D (NIOSH) See Appendix D	Ca	Fine, slender, flaxy fibers; resists fire and most solvents	Properties vary depending upon specific compound	None	NIOSH 77-157A
Azinphos-methyl C ₁₀ H ₁₁ N ₂ O ₃ PS ₂ 86-50-0 TE1925000 2783 55	Guthion; o,o-Dimethyl S-4-oxo-1,2,3-benzotriazin-3(4H)-yl-methyl phosphorodithioate	0.2 mg/m ³	5 mg/m ³	Brown, waxy solid	MW: 317 BP: Decomposes Sol: 0.003% FLP: ?	VP: ≈0 mm MP: 183°F UEL: ? LEL: ?	Strong oxidizers

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam Immed Provide: Eyewash, quick drench	NIOSH ☐: SCBAF;PD,PP/SAF;PD,PP-ASCBA Escape: GMFHIEAG/SCBAE	Inh Abs Con Ing	Ulceration of nas septum, derm, GI disturbances, perit 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 system
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH ☐: SCBAF;PD,PP/SAF;PD,PP-ASCBA Escape: GMFS/SCBAE	Inh	Head; malaise, weak, dizz; dyspnea; abdom and back pain; nau, vomit; bronze skin; hema; jaun; perit neur, [carc]	Breath: Art resp	Blood, kidneys, liver
Clothing: Any poss Goggles: Reason prob Wash: Daily Change: After work if may be contam	NIOSH ☐: SAF;PD,PP-ASCBA/SCBAF;PD,PP Escape: HIEF/SCBAE	Inh Ing	Dysp, interstitial fib, restricted pulm function, finger clubbing, [carc]	Eye: Irr Immed	Lung
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	OSHA 2 mg/m ³ : SA/SCBA/CCROVDMFu 5 mg/m ³ : PAPROVDMFu/ SA:CF/CCRFOVHIE/PAPRTOVHIE/ SA:CF/SCBAF/SAF/GMFOVHIE Q: SCBAF;PD,PP/ SAF;PD,PP-ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Micals; ache eyes; rhin; head; chest wheez, lar spas; saliv; cyan; anor; nau, vomit, diarr; sweat; twitch, para, convul; low BP; card	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, CNS, CVS, blood cholinesterase

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Barium (soluble compounds as Ba) Ba 7440-39-3 CG8370000 1564 55	Synonyms vary depending upon specific compound	0.5 mg/m ³	250 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Incompatibilities vary depending upon specific compound	Filter (cellulose membrane); hot H ₂ O; AA; N
Benzene C ₆ H ₆ 71-43-2 CY1400000 1114 27	Benzol, Cyclohexatriene, Coal tar naphtha, Phenyl hydride	10 ppm 50 ppm ceiling (10 min) (NIOSH) 0.1 ppm 8-hr TWA 1 ppm 15-min ceiling See Appendix A (ACGIH) 10 ppm, A2	Ca	Colorless liquid with an aromatic odor	MW: 78 BP: 176 °F Sol: 0.18% F.P.: 12 °F IP: 9.25 eV	VP: 75 mm MP: 42 °F UEL: 7.1% LEL: 1.3%	Strong oxidizers; chlorine, bromine with iron Char; CS; GC; III
Benzidine C ₁₂ H ₁₀ N ₂ 82-87-5 DC9825000 810001 1885 53	1,1-Biphenyl-4, 4-diamine; 4,4-Diaminobiphenyl; 4,4-Biphenyldiamine; 4,4-Bianiline; 4,4-Diphenylenediamine; 4,4-Diaminodiphenyl; Azotic Diazo Component 112; Fast Corinth Base B; Biphenyl, 4,4'-diamino-p-Diaminodiphenyl	See Appendix C (NIOSH) (ACGIH) A1b	Ca	Colorless or slightly reddish crystalline compound that darkens on exposure to light and air	MW: 184 BP: 755 °F Sol: 400 mg/l at 12 °C F.P. Combustible solid	VP: ? MP: 243 °F UEL: ? LEL: ?	Not available NIOSH 77-157A
Benzoyl peroxide (C ₇ H ₆ CO) ₂ O ₂ 94-36-0 DM8575000 2065 2066 2087 2088 2089 2090 49	Dibenzoyl peroxide	5 mg/m ³ (NIOSH) 5 mg/m ³ 10-hr TWA	7000 mg/m ³	Colorless, odorless solid	MW: 242 BP: N.A. Sol: <1% F.P.: ?	VP: <<1 mm MP: 217 °F UEL: ? LEL: ?	Combustible substances, wood, paper, lithium aluminum hydride; explosive at high temperatures Filter ethyl ether, HPLC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Recommendations vary depending upon specific compound	OSHA 5 mg/m ³ : DMXSO ₂ /SA/SCBA 12.5 mg/m ³ : PAPRDM ⁺ /SA/CF 25 mg/m ³ : HIEF/PAPRTHIE/SAT/CF/ SCBAF/SAF 250 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Upper resp irrit; GI; musc spas; slow pulse, extrasystoles; hypokalemia; irrit eyes; skin burns	Eye: Skin: Breath: Swallow: Irr Immed Water flush immed Art resp Medical attention immed	Heart, CNS, skin, resp sys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Soap wash promptly Change: N.A. Remove: Any wet immed (flamm)	NIOSH ±: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, resp sys; giddy; head; nau; stag- gered gait; ftg, anor, lass; derm; bone marrow depre; abdom pain; [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Blood, CNS, skin, bone marrow, eyes, resp sys
Clothing: Any posa Goggles: Any posa Wash: Immed upon contam/daily Change: After work if any posa contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH ±: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Ing Abs Ing Con	Hema, secondary anem from hemolysis, acute cystitis, acute liv dlaorders, derm, painful and irregular urination, [carc]	Eye: Skin: Breath: Swallow: Irr immed (15 min) Soap wash immed Art resp Medical attention immed	Bladder, kidney, liver, skin, blood
Clothing: Repeat prolong Goggles: Reason posa Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH 50 mg/m ³ : DMXSO ₂ /SA/SCBA ⁺ 125 mg/m ³ : PAPRDM ⁺ /SA/CF ⁺ 250 mg/m ³ : HIEF/SCBAF/SAF/ PAPRTHIE ⁺ 7000 mg/m ³ : SA/PD,PP ⁺ Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit skin, eyes, muc memb; derm	Eye: Skin: Swallow: Irr Immed Soap wash promptly Medical attention immed	Skin, resp sys, eyes

Benzoyl peroxide

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Benzyl chloride C ₇ H ₇ Cl 100-44-7 XS8925000 1738 58	alpha-Chlorotoluene, Benzylchloride anhydrous, Benzylchloride (stabilized)	1 ppm (5 mg/m ³) (NIOSH) 5 mg/m ³ 15-min cell	10 ppm	Colorless to slightly yellow liquid with a pungent, aromatic, irritating odor	MW: 127 BP: 354°F Sol: 0.0033% F.P.: 140°F	VP: 0.9 mm MP: -39°F UEL: ? LEL: 1.1%	Active metals: copper, aluminum, magnesium, iron, zinc, tin; strong oxidizers Char, CS, GC, IH
Beryllium and compounds (as Be) Be 7440-41-7 DS175000 1566 53	Synonyms vary depending upon specific compound	2.0 µg/m ³ 5.0 µg/m ³ cell 25 µg/m ³ (30-min peak) (NIOSH) Ca Not to exceed 0.5 µg/m ³ See Appendix A (ACGIH) 2 µg/m ³ , A2		Appearance and odor vary	Properties vary depending upon specific compound	None	NIOSH 77-157A
Boron oxide B ₂ O ₃ 1303-86-2 ED7900000	Anhydrous boric acid, Boric anhydride, Boric oxide	15 mg/m ³ (ACGIH) 10 mg/m ³	N.A.	Colorless, glassy granules or flakes with no odor	MW: 70 BP: 4622°F Sol: 2.8% Not combustible	VP: ∞ mm MP: 842°F	None hazardous Filter; —; gravimetric; IH
Boron trifluoride BF ₃ 7637-07-2 ED2275000 1008 15	None	1 ppm cell (3 mg/m ³) (NIOSH) None due to absence of reliable monitoring method	100 ppm	Colorless gas which fumes in moist air with pungent irritating odor	MW: 68 BP: -149°F Sol: Very soluble Not combustible IP: 15.55 eV	VP: >1 atm MP: -197°F	Reacts with alkalis, fumes in moist air, particulates reduce visibility —

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 10 ppm: SA*/PAPROVAG* CCROVAG*/GMFOVAG/SCBA* Q: SCBAF-PD,PP/ SAF-PD,PP,ASCBA Escape: GMFOVAG/SCBAE	Inh Ing Con	Irrit eyes, nose; weak; irritable; head; skin eruption; pulm edema	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	Eyes, resp sys, skin
Clothing: Repeat prolong Goggles: Recommended Wash: Daily Change: After work if any poss contam Remove: Promptly contam non- imperv	NIOSH E: SCBAF-PD,PP/SAF-PD, PP,ASCBA Escape: HIEF/SCBAE	Inh	Resp symptoms, weak, ftg. weight loss, [carc]	Eye: Irr immed	Lung, skin, eyes, mucous membranes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv	ACGIH 50 mg/m ³ : DM* 100 mg/m ³ : DMXSO**/SA*/SCBA* 250 mg/m ³ : PAPRDM**/SA,CF* 500 mg/m ³ : SCBAF/SAF/ HIEF/PAPRTHIE* 7500 mg/m ³ : SAF-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP,ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Nasal irrit, conj, erythema, low toxicity	Eye: Skin: Breath: Swallow: Irr immed Water flush promptly Fresh air Medical attention immed	Skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 10 ppm: SA*/SCBA* 25 ppm: SA,CF* 50 ppm: SCBAF/SAF 100 ppm: SAF-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP,ASCBA Escape: GMFS/SCBAE	Inh Con	Nasal irrit, epis; burns eyes, skin; in animals: pneu, kidney damage, nosebleed	Eye: Skin: Breath: Irr immed Water flush immed Art resp	Resp sys, kidneys, eyes, skin

Boron trifluoride

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Bromine Br ₂ 7726-95-6 EF9100000 1744 59	None	0.1 ppm (0.7 mg/m ³)	10 ppm	Heavy, red-brown, fuming liquid with a choking, irritating odor; causes tears	MW: 160 BP: 138°F Sol: 3.5% Not combustible, but strong oxidizer IP: 10.52 eV	VP: 175 mm MP: 19°F Combustible organics, oxidizable material, aqueous ammonia; anhydrous Br ₂ reacts with aluminum, titanium, mercury, potassium; wet Br ₂ reacts with other metals	—
Bromoform CHBr ₃ 75-25-2 PB5800000 2515 58	Tribromomethane	0.5 ppm (5 mg/m ³)	N.A.	Colorless to yellow liquid with an odor like chloroform	MW: 253 BP: 298°F Sol: 0.1% Not combustible IP: 10.51 eV	VP: 5 mm MP: 46°F Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium, strong caustics	Char: CS; GC; III
Butadiene CH ₂ CHCHCH ₂ 106-99-0 E19275000 1010 17	1,3-Butadiene; Divinyl; Biethylenes; Erythrene	1000 ppm (2200 mg/m ³) (NIOSH) Reduce exposures to lowest feasible limit See Appendix A (ACGIH) 10 ppm, A2	20,000 ppm Ca	Colorless gas with a mildly aromatic odor. Liquid <24°F	MW: 54 BP: 24°F Sol: 0.05% F.I.P.: N.A. IP: 9.07 eV	VP: 910 mm MP: -164°F UEL: 11.5% LEL: 2% Strong oxidizers, copper, copper alloys	Char: CS; GC; G
2-Butanone CH ₃ COCH ₂ CH ₃ 78-93-3 EL6475000 1193 26	Methyl ethyl ketone, MEK, Ethyl methyl ketone	200 ppm (590 mg/m ³) (NIOSH) 590 mg/m ³ 10-hr TWA (200 ppm)	3000 ppm	Clear, colorless liquid with a fragrant, mint-like, moderately sharp odor	MW: 72 BP: 175°F Sol: 27% F.I.P.: 21°F IP: 9.48 eV	VP: 70 mm MP: -123°F UEL: 10% LEL: 2% Very strong oxidizers	Ads: CS; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any immed contam Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA:CF+/PAPRS+ 5 ppm: CCRSF/GMFS+/SCBAF/ PAPRTS+/SAF 10 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Dizz, head, lac, epis, cough, feeling of oppres- sion, pulm edema, pneu, abdom pain, diarr, measle-like eruptions, severe burns eyes, skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	Resp sys, eyes, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv	OSHA 12.5 ppm: SA:CF+/PAPROV+ 25 ppm: CCRFOV/GMFOV/SCBAF/SAF PAPRTOV+ 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Ing Inh Abs	Irrit eyes, resp sys: CNS depression; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Skin, liver, kidneys, resp sys, CNS
Clothing: Prevent skin freezing Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH E: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, throat; drow, ll-head; frosbite; [carc]	Eye: Skin: Breath:	Irr immed Water flush immed Medical attention immed	Eyes, resp sys, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Promptly contam non-imperv Provide: Eyewash	NIOSH 1000 ppm: PAPROV+CCRFOV 3000 ppm: GMFOV/SA:CF+/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; head; dizz; vomit	Eye: Skin: Breath: Swallow:	Irr Immed Water wash immed Fresh air Medical attention immed	CNS, lungs

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
2-Butoxy ethanol $C_4H_9OCH_2CH_2OH$ 111-76-2 KJ8575000 2389 26	Butyl cellosolve, ethyleneglycol monobutylether, Dowanol EB, Butyl oxitol, Jeffersol EB, Ektasolve EB	50 ppm (240 mg/m ³) (ACGIH) 25 ppm (120 mg/m ³)	700 ppm	Colorless liquid with a mild odor	MW: 118 BP: 340°F Sol: Miscible <118°F Fl.P: 141°F	VP: 0.6 mm MP: -94°F UEL: 10.6% LEL: 1.1%	Strong oxidizers and caustics Char; CH ₃ OH; CH ₂ Cl ₂ ; GC; III
Butyl acetate $CH_3COO(CH_2)_3CH_3$ 123-86-4 AF7350000 1123 26	n-Butyl acetate, Butyl ethanoate, Acetic acid butyl ester	150 ppm (710 mg/m ³)	10,000 ppm	Colorless liquid with a fruity odor	MW: 116 BP: 260°F Sol: 0.88% Fl.P: 72°F IP: 9.56 eV	VP: 10 mm MP: -101°F UEL: 7.6% LEL: 1.7%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; III
sec-Butyl acetate $CH_3COOCH(CH_2)_2CH_3$ 105-46-4 AF7380000 1123 26	1-Methylpropylacetate	200 ppm (950 mg/m ³)	10,000 ppm	Colorless liquid with a pleasant odor	MW: 116 BP: 234°F Sol: 0.8% Fl.P: 62°F IP: 9.91 eV	VP: 10 mm MP: -146°F UEL: 9.8% LEL: 1.7%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; III
tert-Butyl acetate $CH_3COOC(CH_3)_3$ 540-88-5 AF7400000 1123 26	Acetic acid tert-butyl ester	200 ppm (950 mg/m ³)	10,000 ppm	Colorless liquid with a fruity odor	MW: 116 BP: 208°F Sol: ? Fl.P: 62 to 72°F(est)	VP: ? MP: ? UEL: ? LEL: 1.5%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	ACGIH 250 ppm: SA*/SCBA* 825 ppm: PAPROV*/SA,CF* 700 ppm: GMFOV/CCRFOV/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Abs Con	Irrit eyes, nose, throat; hemolysis, hemoglobinuria	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Liver, kidneys, lymphoid sys, skin, blood, eyes, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: PAPROV*/CCRFOV* 1500 ppm: SA*/SCBA* 3750 ppm: SA,CF* 7500 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; drow; eyes irrit, dry; irrit resp sys	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: PAPROV*/CCRFOV 5000 ppm: SA,CF* 10,000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, head, drow, dry upper resp, dry skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV*/CCRFOV 5000 ppm: SA,CF* 10,000 ppm:GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Itch, inflamm eyes; irrit upper resp; head; narco; dermat	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Resp sys, eyes, skin

tert-Butyl acetate

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Butyl alcohol $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ 71-36-3 EO1400000	1-Butanol, Propylcarbinol, n-Butanol, n-Butyl alcohol, NBA	100 ppm (300 mg/m ³) (ACGIH) 50 ppm cell (150 mg/m ³)	8000 ppm	Colorless liquid with a strong, characteristic odor	MW: 74 BP: 244°F Sol: 7.7% FLP: 84°F IP: 10.04 eV	VP: 4.2 mm MP: -128°F UEL: 11.2% LEL: 1.4%	Strong oxidizers Char; 2-Propanol in CS ₂ ; GC; III
1120 26							
sec-Butyl alcohol $\text{CH}_3\text{CHOHCH}_2\text{CH}_3$ 78-82-2 EO1750000	2-Butanol, Methyl ethyl carbinol, Butylene hydrate, 2-Hydroxybutane	150 ppm (450 mg/m ³) (ACGIH) 100 ppm (305 mg/m ³)	10,000 ppm	Colorless liquid with a strong, pleasant odor	MW: 74 BP: 211°F Sol: 15% FLP: 75°F IP: 10 eV	VP: 13 mm MP: -175°F UEL: 9.8 LEL: 1.7	Strong oxidizers Char; 2-Propanol in CS ₂ ; GC; III
1120 26							
tert-Butyl alcohol $(\text{CH}_3)_3\text{COH}$ 75-65-0 EO1925000	2-Methyl-2-propanol, TBA, Trimethylcarbinol	100 ppm (300 mg/m ³)	8000 ppm	Colorless liquid with a camphor-like odor	MW: 74 BP: 181°F Sol: Miscible FLP: 52°F IP: 9.97 eV	VP: 31 mm MP: 77°F UEL: 8% LEL: 2.4%	Strong mineral acids, strong hydrochloric acid Char; 2-Butanol in CS ₂ ; GC; III
1120 26							
Butylamine $\text{C}_4\text{H}_9\text{NH}_2$ 109-73-9 EO2975000	n-Butylamine, 1-Aminobutane	5 ppm cell (15 mg/m ³)	2000 ppm	Colorless liquid with an odor like ammonia or fish	MW: 73 BP: 172°F Sol: Miscible FLP: 10°F IP: 8.71 eV	VP: 82 mm MP: -56°F UEL: 9.8% LEL: 1.7%	Strong oxidizers and acids NIOSH 78-175
1125 68							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immer (flamm)	ACGIH 1000 ppm: PAPROV+ICRFOV 1250 ppm: SA,CF+ 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; head; vert; drow; corneal inflamm, blur vision, lac, photophobia; dry cracked skin	Eye: Irr immer Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immer	Skin, eyes, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immer (flamm)	ACGIH 1000 ppm: PAPROV+ICRFOV SA+SCBA+ 2500 ppm: SA,CF+ 5000 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Eye irrit, narcosis, dry skin	Eye: Irr immer Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immer	Eyes, skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immer (flamm)	OSHA 1000 ppm: PAPROV+ICRFOV 2500 ppm: SA,CF+ 5000 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Drow; irrit skin, eyes; head; dizz; dry skin	Eye: Irr immer Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immer	Eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immer upon contam Change: N.A. Remove: Any wet immer (flamm) Provide: Eyewash, quick drench	OSHA 50 ppm: SA+SCBA+ICCRS+ 125 ppm: SA,CF+PAPRS+ 250 ppm: CCRSF/GMFS/SCBAF/SAF/ PAPRTS+ 2000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head; skin flush, burns	Eye: Irr immer Skin: Water flush immer Breath: Art resp Swallow: Medical attention immer	Resp sys, skin, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
tert-Butyl chromate (as CrO ₃) <chem>[(CH3)3CO]2CrO2</chem> 1189-85-1 GB2900000	Chromic acid, di-tert-Butyl ester; bis (tert-Butyl) chromate	0.1 mg/m ³ cell (NIOSH) 1 µg Cr(VI)/m ³ 10-hr TWA	Ca	Liquid	MW: 230 BP: ? Sol: ? F.I.P: ?	VP: ? MP: 23 to 32°F UEL: ? LEL: ?	Reducing agents, moisture —
n-Butyl glycidyl ether <chem>C4H9OCH2CHOCH2</chem> 2426-08-6 TX4200000	BGE: 1,2-Epoxy-3-butoxy- propane	50 ppm (270 mg/m ³) (NIOSH) 4.4 ppm (30 mg/m ³) 15-min cell (ACGIH) 25 ppm	3500 ppm	Pale yellow liquid	MW: 130 BP: 327°F Sol: 2% F.I.P: 130°F	VP: 3 mm MP: ? UEL: ? LEL: ?	Strong oxidizers and caustics Char; CS; GC; F
Butyl mercaptan <chem>CH3CH2CH2CH2SH</chem> 109-79-5 EK6300000 2347 27	n-Butanethiol, 1-Mercaptobutane, 1-Butanethiol	10 ppm (35 mg/m ³) (NIOSH) 0.5 ppm (1.5 mg/m ³) 15-min cell	2500 ppm	Colorless liquid with a strong, skunk-like odor	MW: 90 BP: 208°F Sol: 0.6% F.I.P: 35 °F IP: 9.14 eV	VP: 35 mm MP: -178°F UEL: ? LEL: ?	Strong oxidizers, such as dry bleaches Ads; acetone; GC; Set 3
p-tert-Butyltoluene <chem>CH3C6H4C6H5</chem> 96-51-1 XS8400000 2667 27	1-Methyl-4-tert- butylbenzene	10 ppm (60 mg/m ³)	1000 ppm	Colorless liquid with an aromatic odor, somewhat like gasoline	MW: 148 BP: 380°F Sol: insoluble F.I.P(oc): 155°F	VP: <1 mm MP: -62°F UEL: ? LEL: ?	Oxidizers Char; CS; GC; HI

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	E: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHEOV/SCBAE	Inh Abs Ing Con	Lungs, sinus	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, skin, eyes, CNS
Clothing: Any poss Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly upon contam non-imperv	NIOSH 44 ppm: SA/SCBA/CCROV* 110 ppm: SA,CF*/PAPROV* 220 ppm: SCBAF/SAF/CCRFOV/GMFOV/ PAPRTOV* 3500 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; skin Irrit, sens; narcosis	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 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 Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: narcosis, In-co, weak, cyan, pulm, eye Irrit, paralysis	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Resp sys; in animals: CNS, liver, kidneys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 250 ppm: SA,CF*/PAPROV* 500 ppm: CCRFOV/GMFOV/SCBAF/SAF 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin; dry nose, throat; head; low BP, facial, abnormal CVS; CNS depres; hemato depres	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	CVS, CNS, skin, bone marrow, eyes, upper resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Cadmium dust (as Cd) Cd 7440-43-9 EU9800000	Synonyms vary depending upon specific compounds	0.2 mg/m ³ 0.8 mg/m ³ cell (NIOSH) Reduce exposure to lowest feasible limit See Appendix A (ACGIH) 0.05 mg/m ³	Ca	Appearance and odor vary for specific compound	Properties vary depending upon specific compound	Strong oxidizers, elemental sulfur, selenium, tellurium	Filter; acid; AA; III	
2570 53								
Cadmium fume (as Cd) Cd/CdO 1306-19-0 EV1930000	Cadmium oxide fume	0.1 mg/m ³ 0.3 mg/m ³ cell (NIOSH) Reduce exposure to lowest feasible limit See Appendix A (ACGIH) 0.05 mg/m ³ cell	Ca	Finely divided solid particles dispersed in air	MW: 112 to 128 BP: N.A. Sol: Insoluble F.P.: N.A.	VP: 90 mm MP: N.A. UEL: N.A. LEL: N.A.	Not applicable	Filter; acid; AA; III
Calcium arsenate (as As) Ca ₃ (AsO ₄) ₂ 7778-44-1 CG0830000 1573 53	Tricalcium arsenate; Tricalcium ortho-arsenate; Cucumber dust; arsenic acid, calcium salt (2:3)	10 µg/m ³ (NIOSH) 2 µg/m ³ 15-min cell See Appendix A	Ca	Colorless, odorless solid	MW: 398 BP: N.A. Sol: 0.013% Not combustible	VP: 0 mm MP: N.A.	None hazardous	NIOSH 77-157A
Calcium oxide CaO 1305-78-8 EW3100000 1910 60	Quicklime, Pebble lime	5 mg/m ³ (ACGIH) 2 mg/m ³	250 mg/m ³	White or gray, odorless solid	MW: 56 BP: 5162°F Sol: Reacts Not combustible	VP: 0 mm MP: 4658°F	Water	Filter; acid; AA; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: Any poss (CdCl ₂) Wash: Daily/reason prob Change: After work any poss contam Remove: N.A. Provide: Eyewash (CdCl ₂)	NIOSH ☐ SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Ing	Pulm edema, dysp, cough, tight chest, suba pain; head: chills, muscle aches; nau, diarr; anos, emphy, prot; anemia; [carc]	Eye: Irr immed Skin: Soap wash Breath: Art resp Swallow: Medical attention immed	Resp sys, kidneys, prostate, blood
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH ☐ SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: HIEF/SCBAE	Inh	Pulm edema, dysp, cough, tight chest, suba pain; head: chills, muscle aches; nau, diarr; emphy; prot; anos; mild anem; [carc]	Breath: Art resp	Resp sys, kidneys, blood
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam/daily Change: After work any poss contam Remove: Promptly contam non-imperv	NIOSH ☐ SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Weak; GI; peri neur; hyperpigment, palmar planter hyperkeratosis; dem; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, liver, skin, lymphatics, CNS
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam/daily Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash, quick drench	ACGIH 10 mg/m ³ : DM 20 mg/m ³ : DMXSO/SA/SCBA 50 mg/m ³ : PAPRHIE/SA:CF 100 mg/m ³ : HiEF/SCBAF/SAF/ PAPRHIE 250 mg/m ³ : SA:PD,PP ☐ SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, upper resp tract; ulcer, perforate nasal septum; pneumonia; dem, burns	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes

Calcium oxide

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Camphor $C_{10}H_{16}O$ 76-22-2 EX1225000	2-Camphonone, Synthetic camphor, Gum camphor, Laurel camphor	2 ppm (12 mg/m ³)	200 mg/m ³	Colorless, glassy solid with a penetrating, characteristic odor	MW: 152 BP: 405 °F Sol: 0.12% Fl.P: 150 °F	VP: 0.18 mm MP: 356 °F UEL: 3.5% LEL: 0.8%	Oxidizers, chromic anhydride Car; CH ₂ OH/CS ₂ ; GC; III
2717 32							
Carbaryl (Sevin®) $C_{12}H_{11}NO_2$ 63-25-2 FC5950000	1-Naphthyl n-methyl-carbamate, alpha-Naphthyl n-methyl-carbamate	5 mg/m ³ (NIOSH) 5 mg/m ³ 10-hr TWA	600 mg/m ³	Colorless solid	MW: 201 BP: Decomposes Sol: 0.004% Fl.P: ?	VP: 0.005 mm MP: 288 °F UEL: ? LEL: ?	Strong oxidizers Filter; acid; color; III
2757 55							
Carbon black 1333-88-4 FF5800000	Channel black, Lamp black, Furnace black, Thermal black, Acetylene black	3.5 mg/m ³ (NIOSH) 3.5 mg/m ³ 10-hr TWA 0.1 mg/m ³ TWA In presence of polycyclic aromatic hydrocarbons See Appendix A	N.A. Ca	Black odorless solid	MW: 12 BP: N.A. Sol: Insoluble Fl.P: N.A.	VP: 00 mm MP: N.A. UEL: ? LEL: ?	Strong oxidizers, such as chlorates, bromates, nitrates Filter; —; gravimetric; III
Carbon dioxide CO_2 124-38-9 FF6400000	Carbonic acid gas, Dry ice	5000 ppm (NIOSH) 10,000 ppm 10-hr TWA 30,000 ppm 10-min cell	50,000 ppm	Colorless, odorless gas; can be liquid or solid	MW: 44 BP: -109 °F (sublimes) Sol: 0.14% Not Combustible IP: 13.77 eV	VP: >1 atm MP: -109 °F (sublimes)	Chemically active metals, such as sodium, potassium, hot titanium Bag; —; GC; Set 1
1013 21							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 50 mg/m ³ : SA:CF/PAPROVDM+ 100 mg/m ³ : CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE*/SCBAF/SAF 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; nau, vomit, diarr; head; dizz; irrational, epileptiform convuls	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS, eye, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH 50 mg/m ³ : SA*/SCBA* 125 mg/m ³ : SA:CF* 250 mg/m ³ : SCBAF/SAF 600 mg/m ³ : SA:PD,PP* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abe Ing Con	Mtosts, blur, tear, nasal discharge; saliv; sweat; abdom cramps, nau, vomit, diarr; tremor; cyan; convuls; skin Irrit	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, CNS, CVS, skin
Clothing: N.A. Goggles: Repeat Wash: Daily Change: N.A. Remove: N.A.	See Appendix B	Inh Con	None expected; In presence of polycyclic aromatic hydrocarbons: [carc]	Eye: Irr promptly	None known
Clothing: Prevent skin freezing Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 50,000 ppm: SA/SCBA Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	Head, dizz, restless, pares; dysp; sweat; mal; inc heart rate, elevate BP, pulse pressure; coma; asphy; convuls; frostbite	Eye: Medical attention Skin: Medical attention for frostbite Breath: Art resp	Lungs, skin, CVS

Carbon dioxide

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Carbon disulfide CS ₂ 75-15-0 FF6650000 1131 28	Carbon bisulfide	20 ppm 30 ppm ceiling 100 ppm 30-min peak (NIOSH) 1 ppm 10-hr TWA 10 ppm 15-min ceiling (ACGIH) 10 ppm	500 ppm	Colorless to faintly yellow liquid with a strong, disagreeable or sweetish odor	MW: 76 BP: 115 °F Sol: 0.2% F.P.: -22 °F IP: 10.06 eV	VP: 300 mm MP: -169 °F UEL: 50% LEL: 1.3%	Strong oxidizers; chemically active metals, such as sodium, potassium, zinc; azides, organic amines Char; C ₂ H ₂ ; GC; III
Carbon monoxide CO 630-08-0 FG3500000 1018 18	Monoxide	50 ppm (55 mg/m ³) (NIOSH) 35 ppm 8-hr TWA 200 ppm ceiling (No minimum time)	1500 ppm	Colorless, odorless gas	MW: 28 BP: -313 °F Sol: 0.004% F.P.: N.A. IP: 13.96 eV	VP: >1 atm MP: -326 °F UEL: 74% LEL: 12.5%	Strong oxidizers NIOSH 78-175
Carbon tetrachloride CCl ₄ 56-23-5 FG4900000 1846 55	Tetrachloromethane	10 ppm 25 ppm ceiling 200 ppm 5-min/4-hr peak (NIOSH) 2 ppm 60-min ceiling See Appendix A (ACGIH) 5 ppm, A2	Ca	Colorless liquid with an ether-like odor	MW: 154 BP: 170 °F Sol: 0.08% Not combustible	VP: 91 mm MP: -9 °F	Chemically active metals, such as sodium, potassium, magnesium Char; CS ₂ ; GC; III
Chlordane C ₁₂ H ₆ Cl ₄ (approx) 57-74-9 PB9600000 2762 28	1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane	0.5 mg/m ³	500 mg/m ³	Thick, amber liquid with a chlorine-like odor	MW: 410 BP: Decomposes Sol: Insoluble Not combustible	VP: 0.00001 mm MP: ?	Strong oxidizers NIOSH 80-125

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 10 ppm: CCROV/SA/SCBA 25 ppm: SA,CF/PAPROV 50 ppm: CCRFOV/PAPRTOV/GMFOV/ SCBAF/SAF 500 ppm: SA,PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Dizz, head, poor sleep, fig, ner; anor, low-wgt; psychosis; polyneur; Parkinson-like; ocular changes; CVS; GI; burns, derm	Eye: Irr Immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention Immed	CNS, PNS, CVS, eyes, kidneys, liver, skin
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 350 ppm: SA/SCBA 875 ppm: SA,CF 1500 ppm: SCBAF/SAF/GMFS* Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: GMFS*/SCBAE	Inh Con (liq)	Head, tachypnea, nau, weak, dizz, confusion, halu, cyan, depres, ST of electrocardiogram, angina, syncope, frostbite	Breath: Art resp	CVS, lungs, blood, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly contam non- imperv	NIOSH E: 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: Irr Immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention Immed	CNS, eyes, lungs, liver, kidneys, skin
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	OSHA 5 mg/m ³ : CCROVDMFu/SA/ SCBA 12.5 mg/m ³ : SA,CF/PAPROVDMFu 25 mg/m ³ : CCRFOVHIE/SAF/SCBAF/ PAPRTOVHIE/GMFHIEOV 500 mg/m ³ : SA,PD,PP Q: SCBAF,PD,PP/SAF,PD,PP,ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Blur vision; confusion; atax; delirium; cough; ab- dom pain, nau, vomit, diarr; Irrity; tremor, con- vuls; anuria	Eye: Irr Immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention Immed	CNS, eyes, lungs, liver, kidneys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Chlorinated camphene C ₁₁ H ₁₄ Cl ₅ 8001-35-2 XW5250000 2781 55	Toxaphene	0.5 mg/m ³	200 mg/m ³	Waxy, amber-colored solid with a mild turpentine-like odor	MW: 414 BP: Decomposes Sol: 0.0003% Fl.P: 275°F	VP: 0.2 to 0.4 mm MP: 158 to 203°F UEL: ? LEL: ?	Strong oxidizers Filter; petroleum ether; GC; F
Chlorinated diphenyl oxide C ₁₂ H ₈ Cl ₄ O 55720-99-5 KO0875000	Hexachlorodiphenyl oxide	0.5 mg/m ³	5 mg/m ³	Waxy solid or liquid	MW: 377 BP: 446 to 500°F Sol: 0.1% Fl.P: N.A.	VP: = 0 mm MP: ? UEL: ? LEL: ?	Strong oxidizers Filter; iso-octane; GC; I
Chlorine Cl ₂ 7782-50-5 FO2100000 1017 20	None	1 ppm ceiling (3 mg/m ³) (NIOSH) 0.5 ppm 15-min ceiling (1.5 mg/m ³)	30 ppm	Amber liquid or greenish-yellow gas with a characteristic, irritating odor	MW: 71 BP: -29°F Sol: 0.7% Not combustible, but strong oxidizer IP: 11.46 eV	VP: >1 atm MP: -150°F	Combustible substances, finely divided metals NIOSH 77-157A
Chlorine dioxide ClO ₂ 10049-04-4 FO3000000	None	0.1 ppm (0.3 mg/m ³)	10 ppm	Yellow-green to orange gas or liquid with a pungent, sharp odor	MW: 68 BP: 52°F Sol: 0.8% Fl.P: N.A. IP: 10.7 eV	VP: >1 atm MP: -74°F UEL: ? LEL: 10%	Combustible substances, dust, organic matter, sulfur —

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: AP liq/RP solid Goggles: Reason prob Wash: Promptly solid/immmed liq Change: After work it may be contam solid Remove: Promptly solid/immmed liq Provide: Quick drench	OSHA 5 mg/m ³ : SA/SCBA/CCROVDMFu 12.5 mg/m ³ : SA-CF/PAPROVDMFu 25 mg/m ³ : SCBAF/SAF/CCRFOVHIE/PAPRTOVHIE/GMFIHOV 200 mg/m ³ : SA-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Nau, confusion, agitation, tremors, convuls, uncoconscious, dry red skin	Eye: Irr immmed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immmed	CNS, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide:	OSHA 5 mg/m ³ : SA/SCBA Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFHIEOVAG/SCBAE	Inh Ing Con	Acneform derm, liver damage	Eye: Irr immmed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immmed	Skin, liver
Clothing: Any poss Goggles: Any poss Wash: Immmed upon contam Change: N.A. Remove: Immmed contam non-imperv Provide: Eyewash, quick drench	NIOSH 5 ppm: CCRS*/SA*/SCBA* 10 ppm: PAPRS*/CCRFS 12.5 ppm: SA-CF*/PAPRS* 25 ppm: SCBAF/SAF/GMFS 30 ppm: SA-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Con	Burning of eyes, nose, mouth; lac; rhin; cough; chok; nau; vomit; subs pain; head; dizz; syncope; pulm edema, pneu; hypox; derm	Eye: Irr immmed Skin: Water flush immmed Breath: Art resp	Resp sys
Clothing: Any poss Goggles: Any poss Wash: Immmed upon contam Change: N.A. Remove: Any contam immmed Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA-CF*/PAPRS* 5 ppm: CCRSF/GMFS/SCBAF/SAF 10 ppm: SAF-PD,PP Q: 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 immmed Skin: Soap wash immmed Breath: Art resp Swallow: Medical attention immmed	Resp sys, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Chlorine trifluoride ClF ₃ 7790-91-2 FO2800000 1749 44	None	0.1 ppm cell (0.4 mg/m ³)	20 ppm	Greenish-yellow almost colorless liquid or gas with a sweet, irritating odor	MW: 93 BP: 53°F Sol: Reacts Not combustible but highly reactive IP: 13.0 eV	VP: >1 atm MP: -105°F Combustible substances, water, sand, glass, asbestos, silicon-containing compounds	—
Chloroacetaldehyde ClCH ₂ CHO 107-20-0 AB2450000 2232 55	2-Chloroethanal, Chloroacetaldehyde (40% aqueous)	1 ppm cell (3 mg/m ³)	250 ppm	Colorless liquid with a very sharp, irritating odor	MW: 79 BP (748 mm): 185°F Sol: Miscible F.I.P: 190°F (40%) IP: 10.48 eV	VP: 100 mm MP: 3°F (40%) UEL: ? LEL: ?	Oxidizers, acids, water NIOSH 79-141
alpha-Chloroacetophenone C ₆ H ₅ COCH ₂ Cl 532-27-4 AM8300000 1897 58	Phenacyl chloride, omega-Chloroacetophenone, Chloromethyl phenyl ketone, Phenyl chloromethyl ketone, 'tear gas', CN	0.05 ppm (0.3 mg/m ³)	100 mg/m ³	Colorless to gray solid with a sharp, irritating odor	MW: 154 BP: 477°F Sol: Insoluble F.I.P: 244°F IP: 9.44 eV	VP: 0.012 mm MP: 138°F UEL: N.A. LEL: N.A.	Water, steam NIOSH 79-141
Chlorobenzene C ₆ H ₅ Cl 108-90-7 C20175000 1134 27	Monochlorobenzene, Chlorobenzol, Phenyl chloride, MCB	75 ppm (350 mg/m ³) (ACGIH) 75 ppm	2400 ppm	Colorless liquid with a mild aromatic odor	MW: 113 BP: 270°F Sol: 0.1% F.I.P: 84°F IP: 9.07 eV	VP: 8.8 mm MP: -47°F UEL: 7.1% LEL: 1.3%	Strong oxidizers Char; CS; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any contam Immed Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA:CF- 5 ppm: SCBAF/SAF 20 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	In animals: Irrit eyes, resp tract; burns eyes, skin	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Skin, eyes
Clothing: AP > 0.1%/RP <0.1% Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 10 ppm: CCROV*/SA*/SCBA* 25 ppm: SA:CF*/PAPROV* 50 ppm: CCRFOV/GMFOV/SCBAF/SAF 250 ppm: SAF:PD,PP Q: 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 sens	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Eyewash	OSHA 3 mg/m ³ : CCROVDMF 7.5 mg/m ³ : SA:CF*/PAPROVDM* 15 mg/m ³ : CCRFOVHIE/SAF/SCBAF 100 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; pulm edema	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: PAPROV*/CCRFOV 1875 ppm: SA:CF* 2400 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin, eyes, nose; drow, Inco; liver damage	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin, CNS, liver

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
o-Chlorobenzylidene malonitrile $C_{11}H_7ClN_2$ 2698-41-1 003675000	OCBM, CS	0.05 ppm (0.4 mg/m ³) (ACGIH) 0.05 ppm cell (0.4 mg/m ³)	2 mg/m ³	White solid with a pepper odor	MW: 189 BP: 590 to 599 °F Sol: insoluble	VP: <<1 mm MP: 199 to 203 °F MEC: 0.025 g/l	Strong oxidizers NIOSH 79-141
Chlorobromomethane CH_2BrCl 74-97-5 PA5250000 1887 58	Bromochloromethane, Methylene chlorobromide, CB, CBM, Halon 1011	200 ppm (1050 mg/m ³)	5000 ppm	Colorless to pale yellow liquid with a characteristic, sweet odor	MW: 129 BP: 154 °F Sol: 0.9% Not combustible	VP: 117 mm MP: -126 °F	Chemically active metals: calcium, powdered aluminum, zinc, magnesium Char; CS; GC; III
Chlorodiphenyl (42% chlorine) $C_{12}H_7Cl_3$ (approx) 53489-21-9 TQ1356000 2315 31	Polychlorinated biphenyl, PCB	1 mg/m ³ (NIOSH) 1.0 µg/m ³ 10-hr TWA See Appendix A	Ca	Colorless to dark brown liquid with a mild hydrocarbon odor	MW: 258 BP: 617 to 691 °F Sol: insoluble F.L.P.: 349 °F	VP: 0.001 mm MP: -2 °F UEL: ? LEL: ?	Strong oxidizers Filter/Ads; bub; hexane; GC; III
Chlorodiphenyl (54% chlorine) $C_{12}H_5Cl_4$ (approx) 11097-69-1 TQ1360000 2315 31	Polychlorinated biphenyl, PCB	0.5 mg/m ³ (NIOSH) 1.0 µg/m ³ 10-hr TWA See Appendix A	Ca	Pale yellow, viscous liquid with a mild hydrocarbon odor	MW: 326 BP: 699 to 734 °F Sol: insoluble F.L.P.: 432 °F	VP: 0.00006 mm MP: 50 °F UEL: ? LEL: ?	Strong oxidizers Filter/Ads; hexane; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam/daily Change: After work any poss contam Remove: Promptly contam non-imperv	OSHA 2 mg/m ³ : SA:CF*/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Pain, burn eyes, lac, conj, eryt eyelids, blepharospasm; Irrit throat, cough, chest const; head; eryt vesic skin	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 1000 ppm: PAPROV*/CCRFOV 5000 ppm: SA:CF*/GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Disorient, dizz; Irrit eyes, throat, skin; pulm edema	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, liver, kidneys, resp sys, CNS
Clothing: Any poss Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH ≥ SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, chloracne, liver damage, [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Skin, eyes, liver
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Promptly wet non-imperv	NIOSH ≥ SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; acne-form derm; jaun; dark urine; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Skin, eyes, liver

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Chloroform CHCl ₃ 67-66-3 FS9100000 1888 55	Trichloromethane	50 ppm cell (240 mg/m ³) (NIOSH) 2 ppm 80-min cell See Appendix A (ACGIH) 10 ppm, A2	Ca	Colorless liquid with a pleasant, sweet odor	MW: 119 BP: 142°F Sol: 0.8% Not combustible IP: 11.42 eV	VP: 160 mm MP: -82°F Strong caustics, chemically active metals, such as aluminum, magnesium powder, sodium, potassium	Char; CS ₂ ; GC; III
bis-Chloromethyl ether O(CH ₂ Cl) ₂ 542-88-1 KN1575000	Dichloromethylether; BCME; sym-Dichlorodimethylether; Chloro(chloromethoxy) methane; sym-Dichloromethyl ether; Oxybis(chloromethane); Dimethyl-1,1-dichloroether; Chloromethyl ether; Methane, oxybis(chloro-bis-CHE)	See Appendix C (NIOSH) (ACGIH) 0.001 ppm, A1a (5 µg/m ³ , A1a)	Ca	Colorless liquid with a suffocating odor	MW: 115 BP: 219°F Sol: Decomposes F.P.: ?	VP: ? MP: -43°F UEL: ? LEL: ? Water, unstable	NIOSH 77-157A
Chloromethyl methyl ether ClCH ₂ OCH ₃ 107-30-2 KN8850000 300178 1239 28	Methyl chloromethyl ether; Chloromethoxymethane; CMME; Ether, dimethyl chloro; Monochlorodimethylether; Dimethylchloroether; Chlorodimethylether; Methyl chloromethyl ether, anhydrous (DOT)	See Appendix C (NIOSH) (ACGIH) A2	Ca	Clear, colorless liquid	MW: 80.5 BP: 138°F Sol: Decomposes F.P.: ?	VP: ? MP: -154°F UEL: ? LEL: ? Water, unstable	NIOSH 77-157A
1-Chloro-1-nitropropane C ₃ H ₇ ClCINO ₂ 600-25-8 TX5075000	None	20 ppm (100 mg/m ³) (ACGIH) 2 ppm (10 mg/m ³)	2000 ppm	Colorless liquid with an unpleasant odor that causes tears	MW: 124 BP: 285°F Sol: <0.8% F.P.: 144°F	VP(77°F): 5.8 mm MP: ? UEL: ? Strong oxidizers	Ads: ethyl acetate; GC; Set 6

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly contam non-imperv	NIOSH ≥ SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz, mental dullness; nau; head; ftg; anes; hepatomegaly; eye, skin irr; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Liver, kidneys, heart, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed 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 sys; pulm congestion, edema; corn damage, nec; reduced pulm function, cough, dysp, wheez; hemoptysis, bronchial secretions; [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Lungs, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed 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; weight loss; bronchial secretions; [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes, mucous membranes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	ACGIH 50 ppm: SA:CF/PAPROV ^a 100 ppm: CCRFOV/GMFOV/SCBAF/SAF 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: Irrit lungs, eyes; liver, kidney, heart, blood vessel damage	Eye: Irr immed Skin: Soap wash Breath: Art resp Swallow: Medical attention immed	In animals: resp sys, liver, kidneys, CVS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Chloropicrin CCl ₃ NO ₂ 76-06-2 P86300000 1580 56	Nitrotrichloromethane, Trichloronitromethane, Nitrochloroform	0.1 ppm (0.7 mg/m ³)	4 ppm	Colorless, oily liquid with a sharp, penetrating odor that causes tears	MW: 164 BP: 234°F Sol: 0.2% Not combustible, but heated material will detonate	VP: 20 mm MP: -63°F	Strong oxidizers —
Chloroprene CH ₂ CClCH=CH ₂ 126-90-8 E19625000 1991 30	2-Chloro-1,3-Butadiene; Chlorobutadiene; beta-Chloroprene	25 ppm (90 mg/m ³) (NIOSH) 1 ppm 15-min cell See Appendix A (ACGIH) 10 ppm	Ca	Colorless liquid with an ether-like odor	MW: 89 BP: 138°F Sol: insoluble F.P.: -4°F IP: 8.83 eV	VP: 179 mm MP: -202°F UEL: 20% LEL: 4%	Peroxides, other oxidizers Char; CS ₂ ; GC; III
Chromic acid and chromates (as CrO ₃) H ₂ CrO ₄ 7738-94-6 GB2450000 1463 42 1756 80	Synonyms vary depending upon specific compound	See Appendix D	*30 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Combustible, organic, or other readily oxidizable materials: paper, wood, sulfur, aluminum, plastics, etc.	Filter; H ₂ SO ₄ & diphenyl- carbazide; color; III
Chromium metal and insoluble salts (as Cr) Cr 7440-47-3 GB4200000	Synonyms vary depending upon specific compound	See Appendix D	500 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers	Filter; acid; AA or ICP; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA,CF*/PAPROV* 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: Art resp Swallow: Medical attention Immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet Immed (flamm)	NIOSH ☐: SCBAF:PD,PP SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, resp sys; nar, irrity; derm, alopecia; [carc]	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work it may be Remove: Immed contam non-imperv Provide: Eyewash, quick drench	See Appendix B	Inh Ing Con	Resp, nas septum irrit; leucyt, leupan, monocyt, eosin; eye injury, conj; skin ulcer, sens derm	Eye: Irr Immed Skin: Soap flush Immed Breath: Art resp Swallow: Medical attention Immed	Blood, resp sys, liver, kidneys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 2.5 mg/m ³ : DMXS* 5 mg/m ³ : DMXSQ*/SA*/SCBA* 12.5 mg/m ³ : PAPRODM*/SA,CF* 25mg/m ³ : HIEF/PAPRTHIE*/SCBAF/SAF 500 mg/m ³ : SAF:PD,PP ☐: SCBAF: PD,PP/SAF:PD,PP: ASCBA Escape: HIEF/SCBAE	Inh Ing	Histologic fibrosis of lungs; Chromium (VI): [carc]	Eye: Irr Immed Skin: Soap wash Breath: Art resp Swallow: Medical attention Immed	Resp sys

Chromium metal and insoluble salts (as Cr)

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Chromium: soluble chromic and chromous salts (as Cr) Cr. 7440-47-3 GB4200000	Synonyms vary depending upon specific compound	See Appendix D	250 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Water	Filter; acid; AA or ICP; III
Coal tar pitch volatiles 65996-93-2 GF8655000	Synonyms vary depending upon specific compound	See Appendix D (NIOSH) See Appendix D	Ca	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers	NIOSH 77-157-A
Cobalt metal, fume, and dust (as Co) Co 7440-48-4 GF8750000	Synonyms vary depending upon specific compound	0.1 mg/m ³ (NIOSH) insufficient data to warrant a new exposure limit	20 mg/m ³	Odorless, black solid or finely divided particulates dispersed in air	MW: 59 to 182 BP: 5612 °F Sol: Insoluble F.I.P.: N.A.	VP: 0 mm MP: 2715 °F UEL: N.A. LEL: N.A.	Strong oxidizers Filter; acid; AA or ICP; III
Copper dust and mist (as Cu) Cu 7440-50-8 GL5325000	Synonyms vary depending upon specific compound	1 mg/m ³	N.A.	Odorless solids	MW: CuSO ₄ : 250 CuCl: 99 BP: N.A. Sol: CuSO ₄ : 35% CuCl: 0.006% F.I.P.: ?	VP: N.A. MP: CuSO ₄ : 302 °F CuCl: 806 °F UEL: ? LEL: ?	Acetylene gas, magnesium metal Filter; acid; AA, III

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 2.5 mg/m ³ : DMXS* 5 mg/m ³ : DMXSQ*/SA*/SCBA* 12.5 mg/m ³ : PAPRDM*/SA:CF* 25 mg/m ³ : HIEF/PAPRTHIE*/ SCBAF/SAF 250 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Ing Con	Sens derm	Eye: Skin: Breath: Swallow:	Irr Immed Water flush promptly Art resp Medical attention Immed	Skin
Clothing: Reason prob Goggles: Reason prob Wash: Daily reason prob Change: After work it may be contam Remove: N.A.	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Con	Derm, bronchitis, (carc)	Eye: Skin: Breath:	Irr Immed Soap wash Art resp	Resp sys, bladder, kidneys, skin
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv	NIOSH 0.5 mg/m ³ : DMXS* 1 mg/m ³ : DMXSQ*/DMFu*/SA*/SCBA* 2.5 mg/m ³ : PAPRDM*/SA:CF*/PAPRDMFu* 5 mg/m ³ : HIEF/SCBAF/SAF 20 mg/m ³ : SAF:PD,PP Q: 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: Skin: Breath: Swallow:	Irr Immed Soap wash Art resp Medical attention Immed	Resp sys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv	OSHA 5 mg/m ³ : DMXS* 10 mg/m ³ : DMXSQ*/SA*/SCBA* 25 mg/m ³ : PAPRDM*/SA:CF* 50 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE* 1000 mg/m ³ : SA:PD,PP* 2000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit muc memb, pharynx; nas perforation; eye irit; metal taste; derm	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention Immed	Resp sys, skin, liver, inc risk with Wilson's disease, kidneys

Copper dust and mist (as Cu)

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Copper fume (as Cu) Cu 7440-50-8 GL5325000	Synonyms vary depending upon specific compound	0.1 mg/m ³	N.A.	Finely divided particulates dispersed in air	MW: 64 to 143 BP: N.A. Sol: Insoluble F.P: N.A.	VP: 80 mm MP: N.A. UEL: N.A. LEL: N.A.	Acetylene gas Filter; acid; AA; III
Cotton dust (raw) GN2275000	None	See Appendix D	500 mg/m ³	Colorless, odorless solid	BP: Decomposes Sol: Insoluble F.P: N.A.	VP: 80 mm MP: Decomposes UEL: N.A. LEL: N.A.	Strong oxidizers —
Crag® herbicide C ₆ H ₄ Cl ₂ OOSO ₃ Na 136-78-7 KK4900000	Seesone; Crag® herbicide No. 1; Sodium-2-(2,4-dichloro-phenoxy) ethyl sulfate	15 mg/m ³ (ACGIH) 10 mg/m ³	5000 mg/m ³	Colorless, odorless solid	MW: 308 BP: Decomposes Sol: 25% Not combustible	VP: 80 mm MP: 338°F	Strong oxidizers NIOSH 79-141
Cresol CH ₃ C ₆ H ₄ OH 1319-77-3 G05980000 2078 55	Cresylic acid; ortho-, meta-, or para-Cresol; 2-,3-, or 4-Methyl phenol	5 ppm (22 mg/m ³) (NIOSH) 2.3 ppm (10 mg/m ³) 10-hr TWA	250 ppm	Colorless solid or liquid with a sweet tarry odor	MW: 108 BP: 383 to 448°F Sol: 2.5/2.2/1.9% F.P: o-178/ m-187/ p-187°F IP: 8.93/8.98/ 8.97 eV	VP: 0.25/ 0.15/0.1 mm MP: 88/54/ 95°F UEL: ? LEL: ?	Strong oxidizers SiO ₂ ; acetone; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 1 mg/m ³ : DMFu/SA/SCBA 2.5 mg/m ³ : PAPRDMFu/SA:CF 5 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 100 mg/m ³ : SA:PD,PP ^a 200 mg/m ³ : SAF:PD,PP G: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Metal fume fever; chills, muscle ache, nau, fever, dry throat, cough, weak, lass; irrit eyes, upper resp; metal or sweet taste; discolor skin, hair	Breath: Art resp	Resp sys, skin, eyes, inc risk with Wilson's disease
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 1000 µg/m ³ : D 2000 µg/m ³ : DXSQ/SA/IE/SCBA 5000 µg/m ³ : PAPRD/SA:CF 10 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF I/SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Tight chest, cough, wheez, dysp, decrease FEV, bron; mal; fever, chills; upper resp	Eye: Irr immed Breath: Fresh air	Resp sys, CVS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	ACGIH 50 mg/m ³ : DMXS 100 mg/m ³ : DMXSQ/SA/SCBA 250 mg/m ³ : PAPRDM/SA:CF 500 mg/m ³ : HIEF/SCBAF/SAF/ PAPRTHIE/SAT:CF ^a 5000 mg/m ³ : SA:PD,PP ^a G: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	None known in humans	Eye: Irr immed Skin: Water wash promptly Breath: Art resp Swallow: Medical attention immed	None known
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 23 ppm: CCROVDM/SA/SCBA 57.5 ppm: SA:CF/APPROVDM 115 ppm: CCRFOVHIE/SAF/SCBAF/ GMFHIEOV/PAPRTHIE/SAT:CF ^a 250 ppm: SAF:PD,PP G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	CNS effects; conf, deprea; resp fail; dysp, irreg rapid resp, weak pulse; skin, eye burns; dermat	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS, resp sys, liver, kidneys, skin, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Crotonaldehyde CH ₃ CH=CHCHO 123-73-9 GP9825000 1143 28	beta-Methylacrolein, Propylene aldehyde, Crotonic aldehyde, 2-Butenal	2 ppm (6 mg/m ³)	400 ppm	Colorless to straw-colored liquid with an irritating, pungent, suffocating odor	MW: 70 BP: 216°F Sol: 15.5% Fl.P: 55°F IP: 9.73 eV	VP: 30 mm MP: -103°F UEL: 15.5% LEL: 2.1%	Caustics, ammonia, organic amines, mineral acids, strong oxidizers NIOSH 79-141
Cumena C ₉ H ₈ C ₂ H ₆ 98-82-8 GR8575000 1918 28	Isopropyl benzene, 2-Phenyl propane, Cumol	50 ppm (245 mg/m ³)	8000 ppm	Colorless liquid with a sharp, penetrating aromatic odor	MW: 120 BP: 306°F Sol: Insoluble Fl.P: 111°F IP: 8.89 eV	VP: 8 mm MP: -141°F UEL: 6.5% LEL: 0.9%	Oxidizers Char; CS ₂ ; GC; III
Cyanides (as CN) KCN/NaCN 1588 55	1) Potassium cyanide 2) Sodium cyanide	5 mg/m ³ (NIOSH) 5 mg/m ³ 10-min cell	50 mg/m ³	White solids with a faint almond odor	MW: 65/49 BP: ?/2732°F Sol: 72%/58% Not combustible	VP: 90 mm MP: 1175/ 1040°F	Strong oxidizers, such as nitrates, chlorates, acids, acid salts Filter & bub (KOH); OH; ISE; III
Cyclohexane C ₆ H ₁₂ 110-82-7 GU6300000 1145 28	Hexahydrobenzene, Hexamethylene, Benzene hexahydride	300 ppm (1050 mg/m ³)	10,000 ppm	Colorless liquid with a mild, sweet odor	MW: 84 BP: 177°F Sol: <0.01% Fl.P: -4°F IP: 9.88 eV	VP: 95 mm MP: 44°F UEL: 8.4% LEL: 1.3%	Oxidizers Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 20 ppm: CCROV/SA/SCBA* 50 ppm: SA/CF/PAPROV* 100 ppm: CCRFOV/GMFOV/SCBAF/SAF 400 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys, skin	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 500 ppm: CCROV/ SA/SCBA* 1000 ppm: PAPROV/CCRFOV 1250 ppm: SA/CF* 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; dermat; narco; coma	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, upper resp sys, skin, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 50 mg/m ³ : SA/SCBA Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFSHIE/SCBAE	Inh Abs Ing Con	Asphyxia & death can occur; weak; head; confusion; nau, vomit; inco rate resp, slow gasping resp; eye, skin Irrit	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CVS, CNS, liver, kidneys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV/CCRFOV 7500 ppm: SA/CF* 10,000 ppm: GMFOV/SCBAF/SAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Ing Inh Con	Irrit eyes, resp sys; drowsy; dermat; narco, coma; dizz; nau	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Cyclohexanol C ₆ H ₁₂ O 108-83-0 GV7875000	Hexalin, Hydralin, Hydroxycyclohexane, Anol, Hexahydrophenol, Cyclohexyl alcohol	50 ppm (200mg/m ³)	3500 ppm	Colorless, viscous liquid or sticky solid with a faint camphor odor	MW: 100 BP: 322°F Sol: 3.6% F.P.: 154°F IP: 10 eV	VP: 1 mm MP: 75°F UEL: ? LEL: 2.4%	Strong oxidizers Char, 2-Propanol in CS; GC
Cyclohexanone C ₆ H ₁₀ O 108-94-1 GW1050000 1915 26	Pimelic ketone, Cyclohexyl ketone	50 ppm (200 mg/m ³) (NIOSH) 25 ppm (100 mg/m ³) 10-hr TWA (ACGIH) 25 ppm	5000 ppm	Water-white to slightly yellow liquid with a peppermint-like odor	MW: 98 BP: 314°F Sol: 15% F.P.: 111°F IP: 9.14 eV	VP: 2 mm MP: -53°F UEL: ? LEL: (212°F) 1.1%	Oxidizing agents, nitric acid Char, CS; GC; III
Cyclohexene C ₆ H ₁₀ 110-83-8 GW2500000 2256 29	Benzene tetrahydride	300 ppm (1015 mg/m ³)	10,000 ppm	Colorless liquid with a sweetish odor	MW: 82 BP: 181°F Sol: Very low F.P.: 10°F IP: 8.95 eV	VP: 67 mm MP: -155°F UEL: (212°F) 5% LEL: 1%	Strong oxidizers Char, CS; GC; III
Cyclopentadiene C ₅ H ₆ 542-92-7 GY1000000	1,3-Cyclopentadiene	75 ppm (200 mg/m ³)	2000 ppm	Colorless liquid with a sweet odor like turpentine; dimer crystalline, camphor-like odor	MW: 68 BP: 107°F Sol: Insoluble F.P.: (oc):<90°F IP: 6.57 eV	VP: ? MP: -121°F UEL: ? LEL: ?	Strong oxidizers NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 500 ppm: CCROV/SA/SCBA* 1000 ppm: PAPROV/CCRFOV 1250 ppm: SA,CF* 2500 ppm: GMFOV/SCBAF/SAF 3500 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narcosis; irrit skin	Eye: Skin: Breath: Swallow: Irr immed Water wash promptly Art resp Medical attention immed	Eyes, resp sys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 625 ppm: SA,CF-r/PAPROV* 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; CNS, narcosis, skin	Eye: Skin: Breath: Swallow: Irr immed Water flush promptly Art resp Medical attention immed	Resp sys, eyes, skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV/CCRFOV 7500 ppm: SA,CF* 10,000 ppm: GMFOV/SCBAF/SAF Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit, skin, eyes, resp sys; drow	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 750 ppm: CCROV/SA/SCBA 1000 ppm: PAPROV/CCRFOV/PAPRTOV 1875 ppm: SA,CF 2000 ppm: GMFOV/SCBAF/SAF Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Eyes, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
2,4-D C ₈ H ₆ Cl ₂ O ₂ 84-75-7 AG6825000 2785 55	2,4-Dichlorophenoxy-acetic acid	10 mg/m ³	500 mg/m ³	Colorless, odorless solid	MW: 221 BP: Decomposes Sol: 0.07 ppm FLP: ?	VP: 90 mm MP: 284°F UEL: ? LEL: ?	Strong oxidizers Filter; CH ₃ OH; HPLC; III
DDT C ₁₄ H ₉ Cl ₅ 50-29-3 KJ3325000 2761 55	p,p'-DDT; 2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane; Dichlorodiphenyl-trichloroethane	1 mg/m ³ (NIOSH) lowest detectable limit (0.5 mg/m ³ TWA by NIOSH-validated method) See Appendix A	Ca	Colorless solid with a weak, chemical odor	MW: 355 BP: Decomposes Sol: 0.00001 Not combustible	VP: 0 mm MP: 228°F	Strong oxidizers Filter; iso-octane; GC; S
Decaborane B ₁₀ H ₁₂ 17702-41-9 HD1400000 1868 34	None	0.05 ppm (0.3 mg/m ³)	20 ppm	Colorless solid with a pungent odor	MW: 122 BP: 418°F Sol: Insoluble FLP: 178°F IP: 10.6 eV	VP(77°F): 0.05 mm MP: 212°F UEL: ? LEL: ?	Oxidizers, water, halogenated compounds --
Demeton® C ₈ H ₁₁ O ₂ PS ₂ OC ₂ H ₅ SC ₂ H ₅ 8065-48-3 TF3150000	Systox®; o,o-Diethyl o-(2-ethylthio)ethyl phosphoro-thioate mixture; demeton-o	0.1 mg/m ³	20 mg/m ³	Light brown liquid with an odor of sulfur compounds	MW: 256 BP(2 mm): 273°F Sol: 0.2% FLP: ?	VP: ? MP: -13°F UEL: ? LEL: ?	Strong oxidizers NIOSH 80-125

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH E: SCBAF: PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Weak, stupor, hyporeflexia, musc twitch, convuls, derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, CNS	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH E: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Pares tongue, lips, face; tremor; appre, dizz, conf, mal; head; convuls; paresis hands; vomit; ir- rit eyes, skin; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS, kidneys, liver, skin, PNS	
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam/daily Change: After work it may be contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA:CF 2.5 ppm: SAF/SCBAF/SAT:CF 20 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Dizz, head, nau, li-head, drow, inco, local musc spas, tremor, convuls, fig	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS	
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 1 mg/m ³ : SA/SCBA 2.5 mg/m ³ : SA:CF 5 mg/m ³ : SCBAF/SAF/SAT:CF 20 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Miosis, ache eyes; rhin; head; chest, wheez, tar spas; saliv; cyan; anor; nau, vomit, abdom cramp, diarr; local sweat; musc fasc; para; dizz; atax; convul; low BP; card	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS, CNS, skin, eyes, blood cholinesterase	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Diacetone alcohol $(CH_3)_2C(OH)CH_2COCH_3$ 123-42-2 SA9100000 1148 26	Diacetone, 4-Hydroxy-4-methyl-2-pentanone, 2-Methyl-2-pentanol-4-one	50 ppm (240 mg/m ³) (NIOSH) 50 ppm (240 mg/m ³) 10-hr TWA	2100 ppm	Colorless liquid with a mild odor	MW: 116 BP: 328 °F Sol: Miscible FLP: 136 °F	VP: 0.8 mm MP: -45 °F UEL: 8.9% LEL: 1.8%	Strong oxidizers and alkalis Char, 2-Propanol in CS ₂ , GC, III
Diazomethane CH_2N_2 334-85-3 PA7000000	Azlmethylene, Diazirine	0.2 ppm (0.4 mg/m ³)	10 ppm	Yellow gas, or liquid under pressure	MW: 42 BP: -9 °F Sol: Reacts FLP: N.A. IP: 8.99 eV	VP: >1 atm MP: -229 °F UEL: ? LEL: ?	Alkali metals, drying agents such as calcium sulfate Resin, CS ₂ , GC, J
Diborane B_2H_6 19287-45-7 HC9275000 1911 18	Boroethane	0.1 ppm (0.1 mg/m ³)	40 ppm	Colorless gas with a repulsive, sweet odor	MW: 28 BP: -134 °F Sol: Reacts FLP: ? IP: 11.4 eV	VP: >1 atm MP: -265 °F UEL: 96% LEL: 0.8%	Air, halogenated compounds, aluminum, lithium, active metals, oxidized surfaces NIOSH 82:100
*Dibromochloropropane (see page 240)							
Dibutyl phosphate $(C_4H_9O)_2(OH)PO$ 107-65-4 TB9805000	Dibutyl acid o-phosphate, Di-n-butyl hydrogen phosphate, Dibutyl phosphoric acid	1 ppm (5 mg/m ³)	125 ppm	Colorless to brown, odorless liquid	MW: 210 BP: >212 °F Sol: Insoluble FLP: ?	VP: <<1 mm MP: ? UEL: ? LEL: ?	Strong oxidizers NIOSH 79-141

Health Hazards

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	NIOSH 1000 ppm: CCRFOV/PAPROV* 1250 ppm: SA:CF* 2100 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; corneal tissue damage; narcosis; skin irrit	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Prevent contam or freezing Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash	OSHA 2 ppm: SA*/SCBA* 5 ppm: SA:CF* 10 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF: PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Cough, short breath; head; flush skin, fever; chest pain, pulm edema, pneumonitis; irrit eyes; asthma	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 1 ppm: SA/SCBA 2.5 ppm: SA:CF 5 ppm: SCBAF/SAF/SAT:CF 40 ppm: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Tight chest, precordial pain, short breath, non- productive cough; nau; head; ill-head, verti; chills, fever; ftg; weak; tremor, musc fasc	Eye: Irr immed Breath: Art resp	Resp sys, CNS
*Dibromochloropropane (see page 241)					
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv Provide: Quick drench	OSHA 10 ppm: SA/SCBA 25 ppm: SA:CF 50 ppm: SCBAF/SAF/SAT:CF 125 ppm: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Resp Irrit; head; Irrit skin, eyes, nose	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin

Dibutyl Phosphate

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Dibutylphthalate $C_{16}H_{22}(CO_2C_4H_9)_2$ 84-74-2 T10875000	DBP; Dibutyl; 1,2-Benzene- dicarboxylate	5 mg/m ³	9300 mg/m ³	Colorless, oily liquid with a very weak, aromatic odor	MW: 278 BP: 635°F Sol: 0.45% Fl.P: 315°F	VP: <0.01 mm MP: -35°F UEL: ? LEL: 0.5% (at Fl.P)	Nitrates; strong ox- idizers, alkalies, and acids Filter; CS; GC; D
o-Dichlorobenzene $C_6H_4Cl_2$ 95-50-1 CZ4500000 1591 58	1,2-Dichlorobenzene; o-Dichlorobenzol	50 ppm ceil (300 mg/m ³)	1700 ppm	Colorless to pale yellow liquid with a pleasant, aromatic odor	MW: 147 BP: 356°F Sol: 0.015% Fl.P: 151°F IP: 8.06 eV	VP: 1.2 mm MP: 0.5°F UEL: 9.2% LEL: 2.2%	Strong oxidizers, hot aluminum or aluminum alloys Char; CS; GC; J
p-Dichlorobenzene $C_6H_4Cl_2$ 106-46-7 CZ4550000 1592 58	1,4-Dichlorobenzene; Dichloridene; PDCB	75 ppm (450 mg/m ³)	1000 ppm	Colorless solid with a mothball- like odor	MW: 147 BP: 345°F Sol: 0.008% Fl.P: 150°F IP: 8.94 eV	VP: 0.4 mm MP: 127°F UEL: ? LEL: 2.5%	None hazardous Char; CS; GC; T
3,3'-Dichlorobenzidine (and its salts) $C_{12}H_8Cl_2N_2$ 91-94-1 DD0525000 800004	Dichlorobenzidine base; o,o'-Dichlorobenzidine; 3,3'-Dichlorobiphenyl -4,4'-diamine; 3,3'- Dichloro-4,4'-biphenyl- diamine; DCB; 4,4'- Diamino-3,3'-Dichloro- biphenyl; 3,3'-Dichloro- 4,4'-diaminobiphenyl	See Appendix C (NIOSH)	Ca	Gray to purple crystalline solid	MW: 253 BP: ? Sol: Almost insoluble Fl.P: N.A.	VP: ? MP: 271°F UEL: N.A. LEL: N.A.	Not available NIOSH 77-157A

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)		Health Hazards			
				Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: Reason prob Wash: N.A. Change: N.A. Remove: N.A.		OSHA 50 mg/m ³ : DMF 125 mg/m ³ : PAPRDM*/SA:CF* 250 mg/m ³ : HIEF/SCBAF/SAF 9300 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP: ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit nasal passages, upper resp, stomach; light sensitivity	Eye: Skin: Breath: Swallow:	Irr immed Wash regularly Art resp Medical attention immed	Resp sys, GI tract
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv		OSHA 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 1700 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit nose, eyes; liver, kidney damage; skin blister	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Liver, kidneys, skin, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Reason prob daily Change: N.A. Remove: N.A.		OSHA 1000 ppm: SA:CF*/PAPROV*/CCRFOV/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; eye irrit, swell periorbital; profuse rhinitis; anor, nau, vomit; low-wgt; jaun, cirr	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Art resp Medical attention immed	Liver, resp sys, eyes, kidneys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench		NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Allergic skin reaction, sens; head; dizz; caustic burns; frequent urination, dys; hema; GI upsets; upper resp infection; derm; [carc]	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Soap wash immed Art resp Medical attention immed	Bladder, liver, lung, skin, GI tract

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Dichlorodifluoromethane CCl ₂ F ₂ 75-71-8 PA8200000 1028 12	Refrigerant 12, Freon 12, Propellant 12, Halon 122	1000 ppm (4950 mg/m ³)	50,000 ppm	Colorless gas with a characteristic ether-like odor at >20% by volume	MW: 121 BP: -22°F Sol: 0.008% Not combustible IP: 11.97 eV	VP: 5.7 atm MP: -252°F	Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium	Char, CH ₂ Cl ₂ , GC, Set 1
1,3-Dichloro-5,5-dimethylhydantoin C ₈ H ₈ Cl ₂ N ₂ O ₂ 118-52-5 MU0700000	Halane, Dactin	0.2 mg/m ³	5 mg/m ³	White solid with a chlorine-like odor	MW: 197 BP: ? Sol: 0.2% Fl.P: 346°F	VP: ? MP: 296°F UEL: ? LEL: ?	Water, strong acids, easily oxidized materials, such as ammonia salts, sulfides, etc.	—
1,1-Dichloroethane CH ₃ CHCl ₂ 75-34-3 K0175000 2362 27	Asymmetrical Dichloroethane, Ethylidene chloride, 1,1-Ethylidene dichloride	100 ppm (400 mg/m ³)	4000 ppm	Colorless liquid with a chloroform-like odor	MW: 99 BP: 135°F Sol: <0.1% Fl. P: 17°F	VP: 182 mm MP: -142°F UEL: 18% LEL: 6%	Strong oxidizers and caustics	Char, CS ₂ , GC, III
1,2-Dichloroethylene ClCH=CHCl 540-50-0 KV9360000 1150 29	Acetylene dichloride, cis-Acetylene dichloride, Dioform, trans-Acetylene dichloride, sym-Dichloroethylene	200 ppm (790 mg/m ³)	4000 ppm	Colorless liquid with an ether-like, slightly acrid odor, like chloroform	MW: 97 BP: 113 to 140°F Sol: 0.35 to 0.63% Fl.P: 36 to 39°F IP: 9.65 eV	VP: 180 to 265 mm MP: -56 to -115°F UEL: 12.8% LEL: 9.7%	Strong oxidizers	Char, CS ₂ , GC, III

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Prevent wet or freeze Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet Immed (flamm)	OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Dizz, tremors, un- conscious, card arthy, card arrest	Eye: Skin: Breath:	Irr Immed Water flush Immed Art resp	CVS, PNS
Clothing: Repeat prolong Goggles: Any pose Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv Provide: Eyewash	OSHA 2 mg/m ³ : SA/SCBA 5 mg/m ³ : SA:CF/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Irrit eyes, muc memb, resp sys	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention Immed	Resp sys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: SA/SCBA 2500 ppm: SA:CF 4000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	CNS depres; skin irrit; drow; unconscious; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr Immed Soap flush promptly Art resp Medical attention Immed	Skin, liver, kidneys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: P/PROV+CCRFOV 4000 ppm: SA:CF+GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; CNS depression	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention Immed	Resp sys, eyes, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Dichloroethyl ether (CICH ₂ CH ₂) ₂ O 111-44-4 KN0675000 1916 57	bis(2-Chloroethyl)ether; 2,2-Dichloro-diethylether	15 ppm cell (90 mg/m ³) (ACGIH) 5 ppm (30 mg/m ³)	250 ppm	Colorless liquid with a chlorinated solvent-like odor	MW: 143 BP: 353°F Sol: 1.1% F.L.P: 131°F	VP: 0.4 mm MP: -82°F UEL: ? LEL: ?	Strong oxidizers Char; CS ₂ ; GC; III
Dichloromono-fluoromethane CHCl ₂ F 75-43-4 PA8400000 1029 12	Refrigerant 21, Freon 21, Halon 112, Dichlorofluoromethane	1000 ppm (4200 mg/m ³) (ACGIH) 10 ppm (40 mg/m ³)	50,000 ppm	Colorless liquid or gas with a slight ether-like odor	MW: 103 BP: 48°F Sol: 1% Not combustible IP: 12.39 eV	VP: ? MP: -211°F	Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium Char; CS ₂ ; GC; Set 1
1,1-Dichloro-1-nitroethane CH ₂ CCl ₂ NO ₂ 594-72-9 KI1050000 2650 57	None	10 ppm cell (80 mg/m ³) (ACGIH) 2 ppm (10 mg/m ³)	150 ppm	Colorless liquid with an unpleasant odor; causes tears	MW: 144 BP: 257°F Sol: 0.25% F.L.P: 136°F	VP: 15 mm MP: ? UEL: ? LEL: ?	Strong oxidizers Char (pet); CS ₂ ; GC; III
Dichlorotetra-fluoroethane F ₂ ClCCClF ₂ 76-14-2 KI1101000 1958 12	1,2-Dichlorotetra-fluoroethane; Freon 114; Refrigerant 114; Halon 242	1000 ppm (7000 mg/m ³)	50,000 ppm	Colorless liquid or gas with a very slight, ethereal odor	MW: 171 BP: 38°F Sol: 0.01% Not combustible	VP: 1444 mm MP: -137°F	Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium Char; CH ₂ Cl ₂ ; GC; Set 1

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	ACGIH 50 ppm: SA/SCBA* 125 ppm: SA:CF* 250 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Lac; Irrit nose, throat, cough; nau, vomit	Eye: Irr immed Skin: Soap wash Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes	
Clothing: Any poss wet Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed	ACGIH 100 ppm: SA/SCBA 250 ppm: SA:CF 500 ppm: SCBAF/SAF 10,000 ppm: SA:PD,PP 20,000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Asphyxia, card arrhy, card arrest	Eye: Irr Immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv	ACGIH 20 ppm: SA/SCBA 50 ppm: SA:CF 100 ppm: SAF/SCBAF 150 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: Irrit lungs; liver, heart, kidney, blood vessel damage	Eye: Irr Immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Lungs	
Clothing: Any poss wet Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed	OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Resp irrit, asphyxia; card arrhy, card arrest	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Dichlorvos (CH ₃ O) ₂ POOCHClCl 62-73-7 TC0350000 2783 55	DDVP; 2,2-Dichlorovinyl dimethyl phosphate	1 mg/m ³	200 mg/m ³	Colorless to amber liquid with a mild, chemical odor	MW: 221 BP: (1 mm): 170°F Sol: ≈ 1% Not combustible	VP(90°F): 0.032 mm MP: ?	None hazardous NIOSH 79-141
Dieldrin C ₁₂ H ₈ Cl ₆ O 80-57-1 IO1750000 2781 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-d-methano-naphthalene	0.25 mg/m ³ (NIOSH) Lowest detectable limit (0.15 mg/m ³ TWA by NIOSH-validated method) See Appendix A	Ca	Colorless to light tan solid with a mild, chemical odor	MW: 381 BP: Decomposes Sol: 0.02% Not combustible	VP: ≈ 0 mm MP: 348°F	Strong oxidizers, active metals like sodium, strong acids, phenols Filter, iso-octane; GC; T
Diethylamine (C ₂ H ₅) ₂ NH 109-89-7 HZ8750000 1154 68	None	25 ppm (75 mg/m ³) (ACGIH) 10 ppm (30 mg/m ³)	2000 ppm	Colorless liquid with a fishy odor like ammonia	MW: 73 BP: 132°F Sol: Miscible F.L.P.: < 0°F IP: 8.01 eV	VP: 195 mm MP: -58°F UEL: 10.1% LEL: 1.8%	Strong oxidizers and acids SiO ₂ ; H ₂ SO ₄ in CH ₃ OH; GC; J
Diethylaminoethanol (C ₂ H ₅) ₂ NC ₂ H ₄ OH 100-37-8 KK5075000 2686 29	2-Diethylaminoethyl alcohol; N,N-Diethyl-ethanolamine; Diethyl-(2-hydroxyethyl)amine; 2-Diethylamino ethanol	10 ppm (50 mg/m ³)	500 ppm	Colorless liquid with a weak, ammonia odor	MW: 117 BP: 324°F Sol: Miscible F.L.P.: 128°F	VP: 1 mm MP: ? UEL: 11.7% LEL: 6.7%	Strong oxidizers and acids NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv	OSHA 10 mg/m ³ : SA/SCBA 25 mg/m ³ : SA:CF 50 mg/m ³ : SAF/SCBAF/SAT:CF 200 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Miosis, ache eyes; rhin; head; chest, wheez, lar spas; saliv; cyan; anor; nau, vomit, diarr; sweat; musc fasc, para, atax; convul; low BP; card	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS, CNS, eyes, skin, blood cholinesterase
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: Alter work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Head; dizz; nau, vomit, mal; sweat; myoclonic limbjerks; clonic, tonic convul; coma; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS, liver, kidneys, skin
Clothing: Any poss (liq) Goggles: AP > 0.5%/RP < 0.5% Wash: Immed upon contam (liq) Change: N.A. Remove: Any wet Immed (flamm) Provide: > 0.5% Eyewash/liq quick drench	ACGIH 250 ppm: SA:CF*/PAPRS* 500 ppm: GMFS/SCBAF/SAF/CCRSF 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Eye, skin, resp irrit	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Reason prob Goggles: AP>5% soln/RP <5% Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash (> 5% soln), quick drench	OSHA 100 ppm: CCROV*/SA*/SCBA* 250 ppm: SA:CF*/PAPROV* 500 ppm: CCRFOV/PAPRTOV*/GMFOV/ SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit; Irrit resp, skin, eye	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes

Diethylaminoethanol

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Difluorodibromomethane CBr ₂ F ₂ 75-81-6 PA7525000 1941 58	Dibromodifluoromethane, Freon 12B2	100 ppm (860 mg/m ³)	2500 ppm	Colorless liquid or gas with a characteristic odor	MW: 210 BP: 76°F Sol: Insoluble Not combustible IP: 11.07 eV	VP: 620 mm MP: -233°F Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium	Char, isopropyl alcohol, GC, H
Diglycidyl ether C ₄ H ₆ O ₃ 2236-07-5 KN2350000	d(Epoxypropyl)ether, bis (2,3-Epoxypropyl)ether; 2-Epoxypropyl ether; Diallyl ether dioxide; DGE	0.5 ppm cell (2.8 mg/m ³) (NIOSH) 1 mg/m ³ 15-min cell (0.2 ppm) See Appendix A (ACGIH) 0.1 ppm	Ca	Colorless liquid with a strong, irritant odor	MW: 130 BP: 500°F Sol: ? F.P.: ?	VP(77°F): 0.09 mm MP: ? UEL: ? LEL: ?	Strong oxidizers —
Diisobutyl ketone (CH ₃) ₂ CHCH ₂ CO 106-83-8 MJ5775000 1157 26	2,6-Dimethyl-4-heptanone; sym-Diisopropylacetone; isovalerone; Valerone	50 ppm (290 mg/m ³) (NIOSH) 25 ppm (140 mg/m ³) 10-hr TWA (ACGIH) 25 ppm (150 mg/m ³)	2000 ppm	Colorless liquid with a mild odor	MW: 142 BP: 335°F Sol: 0.05% F.P.: 140°F	VP: 1.7 mm MP: -43°F UEL: 8.2% LEL: 0.8%	Strong oxidizers Char, CS ₂ , GC, III
Diisopropylamine (CH ₃) ₂ CHNHCH(CH ₃) ₂ 106-18-9 IM4025000 1158 68	None	5 ppm (20 mg/m ³)	1000 ppm	Colorless liquid with an odor like ammonia	MW: 101 BP: 183°F Sol: Miscible <81°F F.P.: 20°F IP: 7.73 eV	VP: 60 mm MP: -141°F UEL: 7.1% LEL: 0.8%	Strong oxidizers, strong acids NIOSH 78-175

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Promptly wet non-imperv	OSHA 1000 ppm: SA/SCBA 2500 ppm: SA:CF/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Frostbite; irrit nose, throat; drow; un- conscious; liver damage	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Skin, resp sys
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam/daily Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; skin burns; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon wet Change: N.A. Remove: Promptly contam non- imperv	NIOSH 825 ppm: SA:CF*/PAPROV* 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; head; dizz; derm; unconscious	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Repeat prolong Goggles: Any poss (soln > 5%) Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash (soln > 5%)	OSHA 125 ppm: SA:CF*/PAPROV* 250 ppm: CCRFOV/GMFOV/SCBAF/SAF 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Ing Inh Abs Con	Nau, vomit; head; eye ir- rit, visual disturbance; pulm irrit	Eye: Irr immed Skin: Water wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Dimethyl acetamide $\text{CH}_3\text{CON}(\text{CH}_3)_2$ 127-19-5 AB770000	N,N-Dimethyl acetamide; DMAC	10 ppm (35 mg/m ³)	400 ppm	Colorless liquid with a faint, ammonia-like odor	MW: 87 BP: 331°F Sol: Miscible Fl.P(oc): 150°F IP: 8.81 eV	VP: 1.5 mm MP: -4°F UEL: 11.5% LEL: 1.8%	Carbon tetrachloride; other halogenated compounds, when in contact with iron	SiO_2 ; CH_3OH ; GC; R
Dimethylamine $(\text{CH}_3)_2\text{NH}$ 124-40-3 IP6750000 72T16689 1032 19	Dimethylamine, anhydrous	10 ppm (18 mg/m ³)	2000 ppm	Colorless liquid or gas with a pungent, fishy, or ammonia-like odor	MW: 45 BP: 44°F Sol: Very soluble Fl.P: N.A. IP: 8.24 eV	VP: 1.7 atm MP: -134°F UEL: 14.4% LEL: 2.8%	Strong oxidizers, chlorine, mercury	SiO_2 , H_2SO_4 , in CH_3OH ; GC; J
4-Dimethylaminoazobenzene $\text{C}_{12}\text{H}_{13}\text{N}_3$ 60-11-7 BX7350000 8300166	N,N-dimethyl-4-aminoazobenzene; N,N-Dimethyl-4-(phenylazo)-benzenamine; p-Dimethylaminoazobenzene; Methyl yellow; Butter yellow; DAB; N,N-Dimethyl-p-phenylazoaniline	See Appendix C (NIOSH)	Ca	Yellow, crystalline leaflets	MW: 225 BP: Sublimes Sol: Insoluble Fl.P: N.A.	VP: ? MP: 240°F UEL: N.A. LEL: N.A.	Not available	NIOSH 78-175
Dimethylaniline $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$ 121-69-7 BX4725000 2253 57	N,N-Dimethylaniline	5 ppm (25 mg/m ³)	100 ppm	Straw- to brown-colored liquid with a characteristic amine-like odor	MW: 121 BP: 379°F Sol: 1.8% Fl.P: 145°F IP: 7.14 eV	VP: <1 mm MP: 36°F UEL: 7% LEL: 1%	Strong oxidizers, strong acids	Char; CS ₂ ; GC; L

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	OSHA 100 ppm: SA/SCBA 250 ppm: SA/CF 400 ppm: SCBAF/SAF Q: 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: AP liq/RP sol Goggles: Any poss Wash: Upon contam liq imm/ soln pro Change: N.A. Remove: Any wet immed (flamm) Provide: Liq: eyewash, quick drench	OSHA 250 ppm: SA/CF+ 500 ppm: SCBAF/SAF 2000 ppm: SAF/PD,PP Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Ing Inh Con	Irrit eyes, throat; sneez, cough, dysp; pulm edema; conj; burns skin, muc memb; derm	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Enlarged liv, hep and renal dysfunction, con- tact derm, cough, wheez, difficulty breathing, bloody sputum, bron- chial secretions, fre- quent urination, hema, dys. [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Liver, skin, bladder
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	OSHA 50 ppm: SA/SCBA 100 ppm: SA/CF/SCBAF/SAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Cyan, weak, dizz, ataxia	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, kidneys, liver, CVS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate C ₂ H ₄ O ₂ PBr ₂ Cl ₂ 300-76-5 TB9450000 2783 55	Naled; 1,2-Dibromo-2,2-dichloro-ethyl dimethyl phosphate; Dibrom	3 mg/m ³	1800 mg/m ³	Colorless solid or straw-colored liquid with a slightly pungent odor	MW: 381 BP: Decomposes Sol: Insoluble Not combustible	VP: 0.0002 mm MP: 81°F	Strong oxidizers	—
Dimethyl formamide HCON(CH ₃) ₂ 68-12-2 LQ2100000 2265 26	N,N-Dimethyl formamide; DMF	10 ppm (30 mg/m ³)	3500 ppm	Colorless liquid with a faint, ammonia-like odor	MW: 73 BP: 307°F Sol: Miscible F.L.P.: 136°F IP: 9.12 eV	VP: 2.7 mm MP: -78°F UEL: 15.2% LEL: 2.2%	Carbon tetrachloride; other halogenated compounds, when in contact with iron; strong oxidizers; alkyl aluminums	SiO ₂ ; CH ₃ OH; GC; R
1,1-Dimethylhydrazine (CH ₃) ₂ NNH ₂ 57-14-7 MV2450000 1183 26	Unsymmetrical Dimethylhydrazine, UDMH	0.5 ppm (1 mg/m ³) (NIOSH) 0.15 mg/m ³ 120-min call See Appendix A (ACGIH) 0.5 ppm, A2	Ca	Fuming, colorless liquid with an amine-like odor	MW: 60 BP: 148°F Sol: Miscible F.L.P.: 5°F IP: 7.46 eV	VP: 103 mm MP: -71°F UEL: 95% LEL: 2%	Oxidizers, halogens, metallic mercury, fuming nitric acid, hydrogen peroxide	Bub (HCl), Phosphomolybdic acid; color, K
Dimethylphthalate C ₁₀ H ₁₀ O ₄ 131-11-3 T11575000	DMP	5 mg/m ³	8300 mg/m ³	Colorless, oily liquid with a slight ester odor	MW: 194 BP: 545°F Sol: 0.04% F.L.P.: 295°F IP: 9.75 eV	VP(212°F): 1 mm MP: 32 to 36°F UEL: ? LEL: 1.2% (at F.L.P)	Nitrates, strong oxidizers, alkalis, and acids	—

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Eyewash	OSHA 30 mg/m ³ : DMFu/SA/HiE/SCBA 75 mg/m ³ : PAPRODMFu/SA/CF 150 mg/m ³ : HiEF/PAPRTHiE/SAT/CF/SCBAF/SAF 1800 mg/m ³ : SA-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Miosis, eye irrit; head; tight chest, wheez; lar spas; saliv; cyan; anor; nau; abdom cramp, diarr; weak, twitch, para, glidd; atax, convul; low BP; card	Eye: Irr Skin: Immed Soap wash Breath: Immed Art resp Swallow: Medical attention Immed	Resp sys, CNS, CVS, skin, eyes, blood cholinesterase
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 100 ppm: CCROV ⁺ /SA ⁺ /SCBA ⁺ 250 ppm: SA/CF ⁺ /PAPROV ⁺ 500 ppm: SCBAF/SAF/GMFOV/CCRFOV/SAT/CF 3500 ppm: SAF-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit, colic; liver damage, hepatomegaly; high BP; face flush; dem	Eye: Irr Skin: Immed Water flush Breath: promptly Art resp Swallow: Medical attention Immed	Liver, kidneys, CVS, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet Immed (flamm) Provide: Eyewash, quick drench	NIOSH E: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes; choking, chest pain, dysp; lethargy; nau; Irrit skin; anoxia; convuls; liver injury; [carc]	Eye: Irr Skin: Immed Water flush Breath: Immed Art resp Swallow: Medical attention Immed	CNS, liver, GI tract, blood, resp sys, eyes, skin
Clothing: N.A. Goggles: Reason prob Wash: N.A. Change: N.A. Remove: N.A.	OSHA 50 mg/m ³ : DMF 125 mg/m ³ : PAPRODM ⁺ /SA/CF ⁺ 250 mg/m ³ : HiEF/SCBAF/SAF 9300 mg/m ³ : SAF-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: HiEF/SCBAE	Ing Inh Con	Irrit nasal passages, upper resp, stomach; eye pain	Eye: Irr Skin: promptly Regularly Breath: Art resp Swallow: Medical attention Immed	Resp sys, GI tract

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Dimethylsulfate (CH ₃) ₂ SO. 77-78-1 WS8225000	Methyl sulfate	1 ppm (5 mg/m ³) (ACGIH) 0.1 ppm, A2 (0.5 mg/m ³ , A2)	10 ppm	Colorless, oily liquid with a faint onion odor	MW: 126 BP: 372°F Sol: 2.8% F.P.: 182°F	VP: 0.5 mm MP: 25°F UEL: ? LEL: ?	Strong oxidizers and ammonia solutions NIOSH 79-141
1595 57							
Dinitrobenzene (all isomers) C ₆ H ₄ (NO ₂) ₂ 528-29-0 CZ7340000	p-Dinitrobenzene, 1,2-Dinitrobenzene, m-Dinitrobenzene, 1,3-Dinitrobenzene, p-Dinitrobenzene, 1,4-Dinitrobenzene	1 mg/m ³	200 mg/m ³	Pale yellow solid	MW: 168 BP: 804/572/ 566°F Sol: 0.015%/ 0.05%/0.01% F.P.: Explodes	VP: <<1 mm MP: 243/ 194/ 343°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals, such as tin, zinc Filter/Bub (ethylene glycol): CH ₂ OH; HPLC; Set 4
1597 58							
Dinitro-o-cresol CH ₃ C ₆ H ₃ OH(NO ₂) ₂ 534-52-1 GO8625000	3,5-Dinitro-2-hydroxytoluene; 4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methyl-phenol; DNOC; DN	0.2 mg/m ³ (NIOSH) 0.2 mg/m ³ 10-hr TWA	5 mg/m ³	Yellow solid	MW: 198 BP: ? Sol: 0.01% F.P.: None	VP: 0.00005 mm MP: 187°F MEC: 0.03 g/l	Strong oxidizers Filter/Bub (ethylene glycol): 2-propanol; HPLC; Set 6
1598 53							
Dinitrotoluene C ₆ H ₄ CH ₃ (NO ₂) ₂ 25321-14-8 XT1300000	DNT	1.5 mg/m ³ (NIOSH) Reduce exposure to lowest feasible level	Ca	Orange-yellow solid (often shipped molten) with a characteristic odor	MW: 182 BP: 482°F Sol: 0.03% F.P.: 404°F	VP: 1 mm MP: 158°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals, such as tin, zinc NIOSH 78-175
1600 56 2038 56							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	ACGIH E: SCBAF/PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, gidd; photo; periorb edema; dysphonia, aphonia, dysphagia cough, chest pain; cyan; vomit; diarr dys, ict, album hema	Eye: Skin: Breath: Swallow:	Irr Immed Water flush Immed Art resp Medical attention Immed	Eyes, resp sys, liver, kidneys, CNS, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed wet/promptly contam Change: After work it may be contam Remove: Immed wet/pro contam non-imperv Provide: Quick drench	OSHA 5 mg/m ³ : DMXS 10 mg/m ³ : DMXSQ/SA/HIE/SCBA 25 mg/m ³ : PAPRDM/SA:CF 50 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 200 mg/m ³ : SA:PD,PP Q: 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; yellowing hair, eyes, skin; anemia	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash Immed Art resp Medical attention Immed	Blood, liver, CVS, eyes, CNS
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam/ daily Change: After work it may be contam Remove: Promptly contam non- imperv	NIOSH 2 mg/m ³ : DMF 5 mg/m ³ : PAPRDM/SA:CF/ HIEF/SAF/SCBAF Q: 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 Art resp Medical attention Immed	CVS, endocrine sys, eyes
Clothing: AP molten/RP liq Goggles: Any poss molten Wash: Immed wet/pro contam/ dally Change: After work it may be contam Remove: Immed wet/pro contam non-imperv Provide: Quick drench	NIOSH E: SCBAF/PD,PP/ SAT:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Anoxia, cyan, anemia, jaundice, [carc]	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash Immed Art resp Medical attention Immed	Blood, liver, CVS

Dinitrotoluene

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Di-sec-octyl phthalate $C_{24}H_{40}O_4$ 117-81-7 TI0350000	DOP, bis-(2-Ethylhexyl) phthalate, Di-2-Ethylhexyl phthalate, DEHP	5 mg/m ³ (NIOSH) Reduce exposure to lowest feasible limit See Appendix A	Ca	Colorless, oily liquid with almost no odor	MW: 390 BP: 727 °F Sol: 0.005% Fl.P(oc): 425 °F	VP: < 0.01 mm MP: -61 °F UEL: ? LEL: ?	Nitrates; strong oxidizers, acids, and alkalies Filter; CS; GC; D
Dioxane $OCH_2CH_2OCH_2CH_2$ 123-91-1 JG8225000 1165 26	Diethylene dioxide; Diethylene ether; Dioxan; p-Dioxane; 1,4-Dioxane	100 ppm (360 mg/m ³) (NIOSH) 1 ppm 30-min cell See Appendix A (ACGIH) 25 ppm	Ca	Colorless liquid with a mild ether-like odor	MW: 88 BP: 214 °F Sol: Miscible FLP: 54 °F IP: 9.13 eV	VP: 29 mm MP: 53 °F UEL: 22% LEL: 2%	Strong oxidizers Char; CS; GC; G
Diphenyl $C_{12}H_{10}$ 92-52-4 DU8050000	Biphenyl, Phenyl benzene	0.2 ppm (1 mg/m ³)	300 mg/m ³	Colorless to pale yellow solid with a very characteristic odor	MW: 154 BP: 488 °F Sol: Insoluble Fl.P: 235 °F IP: 8.27 eV	VP: Very low MP: 156 °F UEL(311 °F): 5.8% LEL(212 °F): 0.6%	Oxidizers Tens; CCI; GC; Set 4
Dipropylene glycol methyl ether $C_7H_{14}O_3$ 34590-94-8 JM1575000	Dipropylene glycol monomethyl ether, Dowanol 50B	100 ppm (800 mg/m ³)	N.A.	Colorless liquid with a weak odor	MW: 148 BP: 374 °F Sol: Miscible Fl.P: 185 °F	VP: 0.3 mm MP: -117 °F UEL: ? LEL: ?	Strong oxidizers Char; CS; GC; F

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH E: SAF:PD,PP:ASCBA/SCBAF:PD/PP Escape: HIEF/SCBAE	Inh Con Ing	Irrit eyes, muc memb; nausea; diarr; [carc]	Eye: Skin: Breath: Swallow: Irr immed Wash regularly Art resp Medical attention immed	Eyes, upper resp sys, GI tract
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Drows, head; nausea, vomit; irrit eyes, nose, throat; liver damage; kidney failure; skin irrit; [carc]	Eye: Skin: Breath: Swallow: Irr immed Water wash promptly Art resp Medical attention immed	Liver, kidney, skin, eyes
Clothing: Repeat prolong Goggles: AP molten/RP otherwise Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 10 mg/m ³ : CCROVDM/SA/SCBA 25 mg/m ³ : SA:CF/PAPROVDM* 50 mg/m ³ : CCRFOVHIE/SAF/SCBAF/ GMFHIEOV/PAPRTOVHIE* 300 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit throat, eyes; head; nausea; ting; numb limbs; liver damage	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	Liver, skin, CNS, upper resp, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 1000 ppm: SA/SCBA 2500 ppm: SA:CF 5000 ppm: SCBAF/SAF/SAT:CF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes, nose; weak, ill- head, head	Eye: Skin: Breath: Swallow: Irr immed Wash promptly Art resp Medical attention immed	Resp sys, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Endrin $C_{12}H_4Cl_6O$ 72-20-8 101575000 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	0.1 mg/m ³	200 mg/m ³	Colorless to tan solid with a mild chemical odor	MW: 381 BP: Decomposes Sol: Insoluble Not combustible, but may be dissolved in flammable solvent	VP: = 0 mm Strong oxidizers and acids	NIOSH 80-125
Epichlorohydrin C_2H_3OCl 106-89-8 TX4900000 2023 30	1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; gamma-Chloropropylene oxide	5 ppm (19 mg/m ³) (NIOSH) Lowest feasible limit See Appendix A (ACGIH) 2 ppm	Ca	Colorless liquid with an irritating, chloroform-like odor	MW: 83 BP: 239°F Sol: 6.4% F.P.: 100°F IP: 10.64 eV	VP: 13 mm MP: -72°F UEL: 21% LEL: 3.8% Strong oxidizers and acids, caustics, zinc, aluminum, chlorides of iron and aluminum	Char. CS; GS; III
EPN $C_{10}H_{10}NO_2PS$ 2104-64-5 TB1925000	o-Ethyl o-p-nitrophenyl thionobenzene phosphonate, o-Ethyl o-p-nitrophenyl benzene-phosphonothioate	0.5 mg/m ³	50 mg/m ³	Yellow solid or brown liquid	MW: 323 BP: ? Sol: Insoluble Not combustible	VP(212°F): 0.0003 mm MP: 97°F Strong oxidizers	Filter, iso-octane; GC; III
Ethanolamine $HOCH_2CH_2NH_2$ 141-43-5 KJ5775000 2491 29	Ethylolamine, Monoethanolamine, beta-Aminoethyl alcohol, 2-Aminoethanol, 2-Hydroxyethylamine	3 ppm (6 mg/m ³)	1000 ppm	Colorless liquid with a mild ammonia-like odor, solid below 51°F	MW: 61 BP: 338°F Sol: Miscible F.P.: 185°F	VP: < 1 mm MP: 51°F UEL: =17% LEL: 5.5% Strong oxidizers and acids	NIOSH 78-175

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 1 mg/m ³ : CCROVDMFu/SA/SCBA 2.5 mg/m ³ : SA:CF/PAPROVDMFu 5 mg/m ³ : CCRFOVH/E/SAF/SCBAF/ GMFHIEOV/PAPRTOVH/E/SAT:CF 100 mg/m ³ : SA:PD,PP 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Epileptiform convul, stupor, head, dizz, ab- dom discomfort, nau, vomit, insom, aggressive confusion, lethargy, weak, anor	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS, liver
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH E: 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: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, lungs, skin, kidneys
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 5 mg/m ³ : SA/SCBA 12.5 mg/m ³ : SA:CF 25 mg/m ³ : SAF/SCBAF/SAT:CF 50 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Miosis, irrit eyes; rhin; head; tight chest, wheez, lar spas, saliv; cyan; anor; nau, abdom cramp, diarr; para convul; low BP; card	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CVS, CNS, eyes, skin, blood cholinesterase
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash	OSHA 30 mg/m ³ : SA/SCBA/CCRS* 75 ppm: SA:CF/PAPRS* 150 ppm: CCRSF/GMFS/SAF/SCBAF 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Resp sys, skin, eye irrit; lethargy	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys

Ethanolamine

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
2-Ethoxyethylacetate $C_6H_{10}OCH_2CH_2OOCCH_3$ 110-80-5 KK8050000	Ethylene glycol monoethyl ether, Cellosolve® solvent	200 ppm (740 mg/m ³) (NIOSH) lowest feasible limit (ACGIH) 5 ppm (19 mg/m ³)	*	Colorless liquid with a sweetish odor	MW: 90 BP: 275°F Sol: Miscible Fl.P(oc): 120°F	VP: 4 mm MP: -94°F UEL: 14% LEL: 1.8%	Strong oxidizers Char; CS ₂ ; GS; III
2-Ethoxyethylacetate $C_6H_{10}OCH_2CH_2OOCCH_3$ 111-15-9 KK8225000	Cellosolve® acetate, Glycol monoethyl ether acetate, Ethylene glycol monoethyl ether acetate	100 ppm (540 mg/m ³) (ACGIH) 5 ppm (27 mg/m ³)	2500 ppm	Colorless liquid with a mild, non-residual odor	MW: 132 BP: 313°F Sol: 23% Fl.P: 117°F	VP: 2 mm MP: -80°F UEL: ? LEL: 1.7%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; III
Ethyl acetate $CH_3COOC_2H_5$ 141-78-6 AH5425000	Acetic ester, Acetic ether, Ethyl ethanoate	400 ppm (1400 mg/m ³)	10,000 ppm	Colorless liquid with a pleasant, fruity odor	MW: 88 BP: 171°F Sol: 8.7% Fl.P: 24°F	VP: 76 mm MP: -117°F UEL: 11% LEL: 2.2%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; E
Ethylamine $C_2H_5NH_2$ 75-04-7 KH2100000	Ethylamine, anhydrous; Aminoethane; Monoethylamine	10 ppm (18 mg/m ³)	4000 ppm	Colorless liquid or gas with a strong ammonia-like odor	MW: 45 BP: 62°F Sol: Miscible Fl.P.: < 0°F IP: 6.86 eV	VP: 1.18 atm MP: -114°F UEL: 14% LEL: 3.5%	Strong acids and oxidizers SiO ₂ ; H ₂ SO ₄ ; ultrasonic; GC; K
1036 68							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards					
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs		
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly contam non-imperv	NIOSH E: SCBAF/PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals: hematologic effects; liver, kidneys, lung damage, irrit eyes	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	In animals: lungs, eyes, blood, kidneys, liver	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	ACGIH 50 ppm: SA*/SCBA* 125 ppm: SA/CF* 250 ppm: SCBAF/SAF 2500 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose; vomit; kidney damage; paralysis	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Resp sys, eyes, GI tract	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: CCRFOV/PAPROV* 10,000 ppm: GMFOV/SAF/SCBAF/SA:CF* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narcosis; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, skin, resp sys	
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed any wet/contam non-imperv Provide: Eyewash, quick drench	OSHA 250 ppm: SA:CF*/PAPRS* 500 ppm: CCRSF/GMFS/SCBAF/SAF 4000 ppm: SAF:PD,PP Q: 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 Art resp Medical attention immed	Resp sys, eyes, skin	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ethyl acrylate <chem>CH2=CHCOOC2H5</chem> 140-88-5 AT0700000	Ethyl propenoate	25 ppm (100 mg/m ³) (ACGIH) 5 ppm (20 mg/m ³)	2000 ppm	Colorless liquid with a sharp, acrid odor	MW: 100 BP: 211°F Sol: 1.5% F.L.P.: 48°F	VP: 29.5 mm MP: -103°F UEL: ? LEL: 1.8%	Oxidizers, peroxides, polymerizers, strong alkalies, moisture Char, CS ₂ , GC, III
1917 27							
Ethyl benzene <chem>C6H5C2H5</chem> 100-41-4 DA0700000	Phenylethane, Ethylbenzol	100 ppm (435 mg/m ³)	2000 ppm	Colorless liquid with an aromatic odor	MW: 106 BP: 277°F Sol: 0.015% F.L.P.: 59°F IP: 8.76 eV	VP: 7.1 mm MP: -139°F UEL: 6.7% LEL: 1.0%	Strong oxidizers Char, CS ₂ , GC, III
1175 26							
Ethyl bromide <chem>C2H5Br</chem> 74-98-4 KH6475000	Bromoethane	200 ppm (890 mg/m ³)	3500 ppm	Colorless to yellow liquid with an ether-like odor	MW: 109 BP: 100°F Sol: 0.9% F.L.P.: < -4°F IP: 10.29 eV	VP: 375 mm MP: -182°F UEL: 11.3% LEL: 6.7%	Chemically active metals: sodium, potassium, calcium powdered aluminum, zinc, magnesium Char; isopropyl alcohol; GC; H
1891 58							
Ethyl butyl ketone <chem>C6H11COC2H5</chem> 106-35-4 MJ5250000	Butyl ethyl ketone, 3-Heptanone	50 ppm (230 mg/m ³)	3000 ppm	Colorless liquid with a mild, fruity odor	MW: 114 BP: 297°F Sol: 0.43% F.L.P.(oc): 115°F IP: 9.15 eV	VP: 4 mm MP: -36°F UEL: 8.8% LEL: 1.4%	Oxidizers Char, <chem>CH3OH</chem> /CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	ACGIH 50 ppm: SA*/SCBA*/CCROV* 125 ppm: SA,CF*/PAPROV* 250 ppm: CCRFOV/GMFOV/SCBAF/SAF/ PAPRTOV* 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys, skin	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV*/SA*/ SCBA*/CCROV* 2000 ppm: GMFOV/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; dermat; narco, coma	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, upper resp sys, skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 2000 ppm: SA/SCBA 3500 ppm: SA,CF/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; CNS depress; irrit skin; pulm edema; liver, kidney disease; card arrhy, card arrest; dizz	Eye: Irr immed Skin: Soap flush promptly Breath: Art resp Swallow: Medical attention immed	Skin, liver, kidneys, resp sys, CVS, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 500 ppm: CCROV*/SA*/ SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA,CF* 2500 ppm: GMFOV/SCBAF/SAF 3000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narco, coma; dermat	Eye: Irr immed Skin: Water flush Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ethyl chloride C_2H_5Cl 75-00-3 KH7525000 1037 27	Chloroethane, Monochloroethane, Hydrochloric ether, Muriatic ether	1000 ppm (2000 mg/m ³)	20,000 ppm	Colorless liquid or gas with a pungent, ether-like odor	MW: 85 BP: 54°F Sol: 0.6% Fl.P: -56°F IP: 10.97 eV	VP: 1064 mm MP: -218°F UEL: 15.4% LEL: 3.8%	Chemically active metals; sodium, potassium, calcium, powdered aluminum Char (2); CS ₂ ; GC; Set 4
Ethylene chlorohydrin CH_2ClCH_2OH 107-07-3 KK0675000 1135 55	2-Chloroethanol, 2-Chloroethyl alcohol	5 ppm (16 mg/m ³) (ACGIH) 1 ppm cell (3 mg/m ³)	10 ppm	Colorless liquid with an ether-like odor	MW: 81 BP: 288°F Sol: Miscible Fl.P: 140°F IP: 10.90 eV	VP: 5 mm MP: -81°F UEL: 15.9% LEL: 4.9%	Strong oxidizers and caustics Char; Isopropyl alcohol in CS ₂ ; GC; H
Ethylenediamine $NH_2CH_2CH_2NH_2$ 107-15-3 KH8575000 1804 29	1,2-Diaminoethane; Ethylenediamine, anhydrous; 1,2-Ethanediamine	10 ppm (25 mg/m ³)	2000 ppm	Colorless liquid or solid with an ammonia-like odor	MW: 80 BP: 242°F Sol: Miscible Fl.P: 93°F	VP: 10 mm MP: 52°F UEL: 11.1% LEL: 5.8%	Strong acids and oxidizers, chlorinated organic compounds NIOSH 78-175
Ethylene dibromide CH_2BrCH_2Br 106-93-4 KH9275000 1805 55	1,2-Dibromoethane; Ethylene bromide	20 ppm 30 ppm cell 50 ppm, 5-min peak (NIOSH) Ca 0.045 ppm, 8-hr TWA 0.13 ppm, 15-min cell See Appendix A (ACGIH) A2		Colorless liquid or solid with a mild sweet odor	MW: 188 BP: 242°F Sol: 0.4% Not combustible IP: 9.45 eV	VP: 11 mm MP: 50°F	Chemically active metals; sodium, potassium, calcium, powdered aluminum, zinc, magnesium; liquid ammonia; strong oxidizers Char; $C_2H_5CH_2OH$ GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	OSHA 10,000 ppm: SA ¹ /SCBA ¹ 20,000 ppm: SA,CF/SCBAF/SAF G: 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 promptly Breath: Art resp Swallow: Medical attention immed	Liver, kidneys, resp sys, CVS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	ACGIH 10 ppm: SCBA ¹ /SA ¹ G: SCBAF,PD,PP/ SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit muc memb; nau, vomit; vertigo, inco; numb, vision disturb; head; thirst; delirium; low BP; collapse, shock, coma	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, liver, kidneys, CNS, skin, CVS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work any poss contam Remove: Any wet/contam non-imperv imm Provide: Eyewash (>5%) quick drench	OSHA 250 ppm: SA,CF ¹ /PAPRS ¹ 500 ppm: CCRSF/GMFS/SCBAF/SAF 2000 ppm: SAF:PD,PP G: SCBAF,PD,PP/ SAF:PD,PP,ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Nasal irrit; primary irrit; sens derm; Irrit resp sys, sath; liver, kidney damage	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, liver, kidneys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	NIOSH G: SCBAF,PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit resp sys, eyes; derm with vesiculation; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, liver, kidneys, skin, eyes

Ethylene dibromide

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ethylene dichloride C ₂ H ₄ Cl ₂ 107-06-02 K10525000 1184 26	Ethylene chloride; 1,2-Dichloroethane; Glycol dichloride	50 ppm 100 ppm ceil 200 ppm 5-min/3 hr peak (NIOSH) 1 ppm, 10-hr TWA 2 ppm, 15-min ceil See Appendix A (ACGIH) 10 ppm	Ca	Clear liquid with a sweet odor like chloroform	MW: 99 BP: 183°F Sol: 0.8% F.L.P: 55°F IP: 9.64 eV	VP: 62 mm MP: -32°F UEL: 16% LEL: 6.2%	Strong oxidizers and caustics, chemically active metals, such as aluminum or magnesium powder, sodium, potassium Char; CS; GC; III
Ethylene glycol dinitrate C ₂ H ₄ (NO ₂) ₂ 628-96-6 KW5600000 and/or Nitroglycerin C ₃ H ₅ (NO ₂) ₃ 55-63-0 QX2100000	Glycol dinitrate, Nitroglycol Blasting gelatin, Glycerin trinitrate, EGDN	1 mg/m ³ ceil (NIOSH) 0.1 mg/m ³ 20-min ceil (ACGIH) 0.05 ppm	80 ppm	Colorless to yellow, oily liquids; nitroglycerin is a solid at <55°F	MW: 152/227 BP: 237/293°F Explodes Sol: 0.5/0.17% F.L.P: Explodes	VP: 0.05/ 0.0015 mm MP: -953°F	Acids Tenax; CH ₂ CH ₂ OH; GC;
Ethyleneimine C ₂ H ₅ N 151-56-4 KX5075000 1185 30	Ethyleimine; Dimethyl- enimine; Dihydroazirine; Azirane; Aziridine; Amino- ethylene; Azacyclo- propane; 1H-Azirine, dihydro-; Dihydro-1H- azirine; Dimethyl- enimine; Ethylimine	See Appendix C (NIOSH) (ACGIH) 0.5 ppm (1 mg/m ³)	Ca	Colorless volatile liquid with intense odor of ammonia	MW: 43 BP: 131 to 132°F Sol: infinitely soluble F.L.P: 12°F	VP: 160 mm MP: 108°F UEL: 46% LEL: 3.3%	Polymerizes explosive- ly in presence of oxidizing materials NIOSH 79-141
Ethylene oxide C ₂ H ₄ O 75-21-8 KX2450000 1040 60	Dimethylene oxide; 1,2-Epoxy ethane; Oxirane	1 ppm (NIOSH) <0.1 ppm, 8-hr TWA 5 ppm, 10-min ceil See Appendix A (ACGIH) 1 ppm, A2	Ca	Colorless liquid or gas with an ether-like odor, irritating at high concentrations	MW: 44 BP: 51°F Sol: Miscible F.L.P: <0°F IP: 10.56 eV	VP: 1095 mm MP: -171°F UEL: 100% LEL: 3%	Even small amounts of strong acids, alkalis, oxidizers; catalytic anhydrous chlorides of iron, aluminum, tin; oxides of iron, aluminum Char; CS; GC; T

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat proloug Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Abs Con	CNS depression; nau, vomit; derm; irrit eyes, corneal opacity; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Kidneys, liver, eyes, skin, CNS
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: After work any poss contam Remove: Any wet immed (flamm) Provide: Quick drench	NIOSH 0.2 ppm: SA ¹ /SCBA ⁴ 0.5 ppm: SA/CF ⁴ 1 ppm: SCBAF/SAF 20 ppm: SA:PD,PP ⁴ 40 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Throb head; dizz; nau, vomit, abdom pain; hypotens; flush; palp; methemoglobinemia; delirium, depre CNS; angina; skin Irrt	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CVS, blood, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Con Ing	Nau, vomit; head; dizz; pulm edema; liv and kid damage; eye burns; skin sens; nose and throat Irrt; [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Eyes, lungs, skin, liver, kidneys
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS ⁴ /SCBAE	Inh Ing Con	Irrit eyes, nose, thoat; peculiar taste; head; nau, vomit, diar; dysp, cyan, pulm edema; drow, weak, inco; EKG abnormalities; burn eyes, skin; frostbite; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Eyes, blood, resp sys, liver, CNS, kidneys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ethyl ether $C_2H_5OC_2H_5$ 80-29-7 K15775000 1155 26	Diethyl ether, Ethyl oxide, Ether, Diethyl oxide, Solvent ether	400 ppm (1200 mg/m ³)	19,000 ppm	Colorless liquid with a characteristic, sweet, ether odor	MW: 74 BP: 95°F Sol: 7.5% F.L.P.: -49°F IP: 9.53 eV	VP: 442 mm MP: -190°F UEL: 36% LEL: 1.9%	Strong oxidizers Char; Ethylacetate; GL; F
Ethyl formate $HCOOC_2H_5$ 109-94-4 LQ8400000 1190 26	Ethyl methanoate, Formic acid ethyl ester	100 ppm (300 mg/m ³)	8000 ppm	Colorless liquid with a fruity odor	MW: 74 BP: 130°F Sol: 13.6% F.L.P.: -4°F IP: 10.81 eV	VP: 194 mm MP: -110°F UEL: 16% LEL: 2.8%	Nitrates; strong oxidizers, alkalies, and acids Char; CS; GC; D
Ethyl mercaptan C_2H_5SH 75-06-1 K19625000 2363 27	Ethanethiol, Ethyl sulfhydryle	10 ppm cell (25 mg/m ³) (NIOSH) 0.5 ppm 15-min cell (1.3 mg/m ³) (ACGIH) 0.5 ppm	2500 ppm	Colorless liquid with a strong skunk-like odor	MW: 62 BP: 95°F Sol: 1.3% F.L.P.: -56°F IP: 9.28 eV	VP: 442 mm MP: -234°F UEL: 18% LEL: 2.8%	Strong oxidizers —
n-Ethylmorpholine C_4H_9ON 100-74-3 OE4025000	4-Ethylmorpholine	20 ppm (94 mg/m ³) (ACGIH) 5 ppm (23 mg/m ³)	2000 ppm	Colorless liquid with an ammonia-like odor	MW: 115 BP: 281°F Sol: Miscible F.L.P.: 90°F	VP: 5 mm MP: -81°F UEL: 9.8% LEL: 1.0%	Strong acids and oxidizers SiO_2 ; H_2SO_4 ultrasonic; GC; K

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat Goggles: prolong Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: CCRFOV/PAPROV* 4000 ppm: SA/SCBA* 10,000 ppm: SA:CF* 19,000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz; drow; head, excited, narcosis; nau, vomit; irrit eyes, upper resp, skin	Eye: Skin: Breath: Swallow:	Irr immed Water wash promptly Art resp Medical attention immed	CNS, skin, resp sys, eyes
Clothing: Repeat Goggles: prolong Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: CCRFOV/PAPROV* 2500 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; narcosis	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Art resp Medical attention immed	Eyes, resp sys
Clothing: Repeat Goggles: prolong Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	NIOSH 5 ppm: SA/SCBA/CCROV 12.5 ppm: SA:CF/PAPROV 25 ppm: SCBAF/SAF/GMFOV/PAPRTOV/ CCRFOV/SAT:CF 500 ppm: SA:PD,PP 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; nau; irrit muc memb, throat; in animals: Inco; para; pulm irrit; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	Resp sys; in animals: liver, kidneys
Clothing: Repeat Goggles: prolong Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash (>15%) quick dranch	ACGIH 50 ppm: SA/SCBA*CCROV* 125 ppm: SA:CF/PAPROV* 250 ppm: SCBAF/SAF/CCRFOV/GMFOV/ PAPRTOV/SAT:CF* 2000 ppm: SAF:PD,PP Q: 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 promptly Art resp Medical attention immed	Resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Ethyl silicate (C ₂ H ₅) ₂ SiO ₂ 78-10-4 VV9450000 1292 29	Ethyl silicate, condensed; Tetraethyl silicate; Ethyl orthosilicate; Tetraethoxysilane	100 ppm (850 mg/m ³) (ACGIH) 10 ppm (85 mg/m ³)	1000 ppm	Colorless liquid with a mild, sweet, alcohol-like odor	MW: 208 BP: 336 °F Sol: Reacts F.P.: 99 °F	VP: 2 mm MP: -121 °F UEL: 23% LEL: 1.3%	Strong oxidizers, water Resin; CS ₂ ; GC; S
Ferbam (CH ₃) ₂ NCS ₂ Fe 14484-64-1 NO6750000	Ferric dimethyl dithiocarbamate, tria(Dimethyl-dithio-carbamate) iron	15 mg/m ³ (ACGIH) 10 mg/m ³	N.A.	Odorless, black solid	MW: 417 BP: Decomposes Sol: 0.01%	VP: 40 mm MP: Decomposes MEC: 0.055 g/l	Strong oxidizers —
Ferrovandium dust 12804-58-9 LK2800000	None	1 mg/m ³ (NIOSH) 1 mg/m ³ 10-hr TWA as vanadium	500 mg/m ³	Dark, odorless solid particles	MW: N.A. BP: N.A. Sol: Insoluble F.P.: N.A.	VP: 40 mm MP: N.A. MEC: 0.0013 g/l	Strong oxidizers —
Fluorides (as F) F 18984-48-8 LM6280000	Synonyms vary depending upon specific compound	2.5 mg/m ³ (NIOSH) 2.5 mg/m ³ 10-hr TWA	500 mg/m ³	Appearance and odor vary depending upon specific compounds	Properties vary depending upon specific compounds	Strong acids	Filters (2; NIOSH; ISE; III

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat Goggles: prolong Wash: Reason prob Change: Promptly upon wet Remove: N.A. Any wet immer (flamm)	ACGIH 100 ppm: SA/SCBA* 250 ppm: SA,CF* 500 ppm: SAF/SCBAF 1000 ppm: SAF,PD,PP Q: SCBAF,PD,PP SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose	Eye: Skin: Breath: Swallow:	Irr immer Soap wash promptly Art resp Medical attention immer	Resp sys, liver, kidneys, blood, skin
Clothing: Repeat Goggles: prolong Wash: Reason prob Change: Promptly upon contam Remove: After work it may be contam Promptly contam non-imperv	ACGIH 50 mg/m ³ : DXS 100 mg/m ³ : DXSQ/SA/ SCBA*HIE* 250 mg/m ³ : PAPRD/SA,CF* 500 mg/m ³ : HIEF/SCBAF/SAF PAPRTHIE/SAT,CF* 7500 mg/m ³ : SA,PD,PP* Q: 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 immer Soap wash promptly Art resp Medical attention immer	Resp sys, skin, GI tract
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 5 mg/m ³ : DM* 10 mg/m ³ : DMXSQ/SA/SCBA* 25 mg/m ³ : PAPRDM/SA,CF* 50 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE* SAT,CF* 500 mg/m ³ : SAF,PD,PP* Q: SCBAF,PD,PP,SAF,PD,PP,ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, resp sys	Eye: Breath:	Irr immer Art resp	Resp sys, eyes
Clothing: Repeat Goggles: prolong Wash: Any poss Change: Promptly upon contam Remove: After work any poss contam Promptly contam non-imperv	NIOSH 12.5 mg/m ³ : DMXS 25 mg/m ³ : DMXSQ/SA/SCBA* 62.5 mg/m ³ : PAPRDM/SA,CF* 125 mg/m ³ : SCBAF/HIEF*/SAF 500 mg/m ³ : SAF,PD,PP Q: SCBAF,PD,PP,SAF,PD,PP,ASCBA Escape: GMFHEAG/SCBAE *NOTE: MAY NEED ACID GAS SORBENT	Inh Ing Con	Irrit eyes, resp sys; naus, abdom pain, diarr; excess saliv, thirst, sweet; stiff spine; derm; calcification of ligaments of ribs, pelvis	Eye: Skin: Breath: Swallow:	Irr immer Soap wash promptly Fresh air, art resp Medical attention immer	Eyes, resp sys, CRS, skeleton, kidneys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Fluorine F ₂ 7782-41-4 LM6475000 1045 20 9192 25	None	0.1 ppm (0.2 mg/m ³)	25 ppm	Pale yellow gas with a pungent, irritating odor	MW: 38 BP: -307°F Sol: Reacts Not combustible, but strong oxidizer IP: 15.69 eV	VP: >1 atm MP: -363°F UEL: ? LEL: ?	Water, nitric acid, most oxidizable materials	—
Fluorotrichloromethane CCl ₃ F 75-69-4 PB8125000 1076 12	Refrigerant 11, Monofluorotrichloromethane, Trichlorofluoromethane, Trichloromonofluoromethane, Freon 11	1000 ppm (5600 mg/m ³) (ACGIH) 1000 ppm cell (5600 mg/m ³)	10,000 ppm	Colorless liquid or gas with a chlorinated solvent odor which is detectable >20% by volume	MW: 137 BP: 75°F Sol: 0.11% Not combustible IP: 11.77 eV	VP: 690 mm MP: -168°F	Chemically active metals: sodium, potassium, calcium, powdered aluminum, zinc, magnesium	Char, CS, GC; Set 1
Formaldehyde HCHO 50-00-0 LP6925000 1196 29 2209 29	1) Methylene oxide; 2) Formalin, methanol free (30 to 50% formaldehyde); 3) Formalin, stabilized, N.F. (β to 15% methanol)	3 ppm 5 ppm cell 10 ppm 30-min cell (NIOSH) 0.1 ppm 15-min cell See Appendix A (ACGIH) 1 ppm, A2	Ca	Colorless liquid or gas with a pungent odor	MW: 30 BP: 3/214/206°F Sol: Miscible Fl.P: N.A./185/ 122°F IP: 10.88 eV	VP: N.A./1/ 1.3 mm MP: 160N.A./ N.A./°F UEL: 73% LEL: 7%	Strong oxidizers, alkalies, and acids; phenols; urea	Ads; Iso-octane; GC; III
Formic acid HCOOH 64-18-6 LQ4900000 1779 80	1) Formic acid 85%; 2) Formic acid 90%; 3) Formic acid 95%; Hydrogencarboxylic acid; Methanoic acid	5 ppm (9 mg/m ³)	100 ppm	Colorless liquid, may be fuming with a pungent, penetrating odor	MW: 46 BP: 224/225/226°F Sol: Miscible Fl.P: N.A./185/ 122°F IP: 11.05 eV	VP: 23 to 33 mm MP: 4.5/20/ 35°F UEL: 57% LEL: 18%	Strong oxidizers, strong caustics, concentrated sulfuric acid	NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 1.0 ppm: SA/SCBA* 2.5 ppm: SA/CF* 5 ppm: SCBAF/SAF 25 ppm: SA/PD,PP* Q: SCBAF/PD,PP SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, resp tract; lar spas, bron spas, pulm edema; eyes, skin burns; in animals: liver, kidney damage	Eye: Irr immed Skin: Water flush immed Breath: Art resp	Resp sys, eyes, skin; in animals: liver, kidneys
Clothing: Repeat prolong Goggles: Any poss Wash: N.A. Change: N.A. Remove: Promptly wet non-imperv Provide: Eyewash, quick drench	OSHA 10,000 ppm: SA/SCBA Q: SCBAF/PD,PP SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Inco, tremors, derm, frostbite, card arrhy, card arrest	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	CVS, skin
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 2: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Ing Con	Irrit eyes, nose, throat; lac; burns nose; cough, bron spas, pulm irrit; derm; nau, vomit; loss of consciousness; [carc]	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 50 ppm: SA/SCBA* 100 ppm: SA/CF*/SAF/SCBAF Q: SCBAF/PD,PP SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Eye irrit loc; nasal discharge; throat irrit, cough, dysp; nau, skin burns, derm	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, kidneys, liver, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Furfural C ₅ H ₄ OCHO 98-01-1 LT7000000 1199 29	2-Furaldehyde, Furfuraldehyde, Fural, 2-Furancarboxaldehyde	5 ppm (20 mg/m ³) (ACGIH) 2 ppm (8 mg/m ³)	250 ppm	Colorless to light-brown liquid, which darkens in light and air, with an odor like almonds	MW: 96 BP: 323°F Sol: 8.3% F.P.: 140°F IP: 0.21 eV	VP: 2 mm MP: -34°F UEL: 19.3% LEL: 2.1%	Strong acids, oxidizers NIOSH 79-141
Furfuryl alcohol C ₅ H ₆ OCH ₂ OH 96-00-0 LU9100000 2874 55	2-Hydroxymethylfuran, 2-Furylmethanol	50 ppm (200 mg/m ³) (NIOSH) 50 ppm (200 mg/m ³) 10-hr TWA (ACGIH) 10 ppm	250 ppm	Amber liquid with a mildly irritating odor	MW: 96 BP: 338°F Sol: Miscible F.P.: 149°F	VP: < 1 mm MP: 6°F UEL: 15.3% LEL: 1.8%	Strong oxidizers, strong acids, organic acids may lead to polymerization Ads; acetone; GC; Set 2
Glycidol C ₃ H ₄ O ₂ 558-52-5 UB4375000	2-Hydroxymethylloxiran; Hydroxymethyl ethylene oxide; Epoxypropyl alcohol; 3-Hydroxypropylene oxide; 2,3-Epoxy-1-propanol	50 ppm (150 mg/m ³) (ACGIH) 25 ppm (75 mg/m ³)	500 ppm	Colorless liquid	MW: 74 BP: 331°F Sol: Miscible F.P.: 182°F	VP(77°F): 0.9 mm MP: -49°F UEL: ? LEL: ?	Strong oxidizers, nitrates Char; THF; GC; F
Graphite (natural) C 7440-44-0 FF5250100	Plumbago, Potelot, Corbo minerals, Black lead, Carburet of iron, Silver lead, Crayon noir	15 mppcf (ACGIH) 2.5 mg/m ³ (resp dust) 5 mg/m ³ (total dust)	N.A.	Black, greasy, odorless solid	MW: 12 BP: N.A. Sol: Insoluble	VP: 00 mm MP: 6040°F MEC: ?	Very strong oxidizers, such as fluorine, chlorine trifluoride, potassium peroxide —

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 20 PPM: CCROV/SA/SCBA* 50 ppm: SA:CF/PAPROV* 100 ppm: CCRFOV/GMFOV/SCBAF/SAF/ PAPRTOV/SAT:CF* 250 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys; head; derm	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	NIOSH 250 ppm: PAPROV// SCBA/SA/CCROV* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz; nau, diarr, vomit, resp depres; body temp depres	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 250 ppm: SA/SCBA* 500 ppm: SA:CF/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat, skin; narcosis	Eye: Irr immed Skin: Water wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 75 mppcf: D 150 mppcf: DXSQ/SA/SCBA 375 mppcf: PAPRDISA:CF 750 mppcf: HIEF/PAPRTHIE/SAF/SCBAF/SAT:CF 7500 mppcf: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Cough, dyspnea, black sputum, pulm func, fibrosis	Eye: Irr immed Breath: Fresh air	Resp Sys, CVS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Hafnium and compounds (as Hf) Hf 7440-58-6 MG4600000 1326 32 2545 40	Synonyms vary depending upon specific compounds	0.5 mg/m ³	250 mg/m ³	Appearance and odor vary depending upon specific compounds	Properties vary depending upon specific compounds	Strong oxidizers and chlorine	NIOSH 79-141
Heptachlor C ₁₁ H ₈ Cl ₂ 76-44-8 PC0700000 2781 55	1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetra-hydro-4,7-methanodene	0.5 mg/m ³	100 mg/m ³	Light tan, waxy solid with an odor like camphor	MW: 374 BP: Decomposes Sol: insoluble Not combustible	VP: 0.0003 mm MP: 114 to 185°F May be dissolved in flammable liquid	Melted heptachlor with iron and rust NIOSH 79-141
Heptane CH ₂ (CH ₂) ₅ CH ₃ 142-82-5 MI7700000 1208 27	Normal heptane, n-heptane	500 ppm (2000 mg/m ³) (NIOSH) 85 ppm 10-hr TWA 440 ppm 15-min cell (ACGIH) 400 ppm	5000 ppm	Colorless liquid with a mild, gasoline-like odor	MW: 100 BP: 209°F Sol: 0.005% FLP: 25°F IP: 9.80 eV	VP: 40 mm MP: -132°F UEL: 8.7% LEL: 1.1%	Strong oxidizers Char, CS ₂ , GC, III
Hexachloroethane CCl ₂ CCl ₂ 87-72-1 KI4025000 9037 53	Perchloroethane	1 ppm (10 mg/m ³) (NIOSH) lowest feasible limit	300 ppm Ca	Colorless solid with a camphor-like odor	MW: 237 BP: 372°F Sol: 0.005% Not combustible	VP: 0.22 mm MP: 372°F Hot iron, zinc, aluminum, alkalis	Char, CS ₂ , GC

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
			Route	Symptoms (See Table 4)	First Aid (See Table 5)		Target Organs
Clothing: Any poss Goggles: Any poss Wash: Promptly upon contam/daily Change: After work any poss contam Remove: Promptly contam non-imperv Provide: Eyewash, quick drench		OSHA 2.5 mg/m ³ : DMXS 5 mg/m ³ : DMXSQ/SA/SCBA 12.5 mg/m ³ : PAPRDM/SA/CF* 25 mg/m ³ : HIEF/PAPRTHIE/SCBAF/SAF/SAT/CF 250 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PPISAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash promptly Art resp Medical attention Irrmed	Eyes, skin, muc memb
Clothing: Reason prob Goggles: Reason prob Wash: Irrmed upon contam Change: After work any poss contam Remove: Irrmed contam non-imperv Provide: Quick drench		OSHA 5.0 mg/m ³ : SA/SCBA 12.5 mg/m ³ : SA/CF 25 mg/m ³ : SAF/SCBAF/SAT/CF 100 mg/m ³ : SA/PD,PP Q: SCBAF/PD,PPISAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	In animals: tremors, convuls, liver damage	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash Irrmed Art resp Medical attention Irrmed	In animals: CNS, liver
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Irrmed (flamm)		NIOSH 800 ppm: CCR/OV/SA/SCBA 1000 ppm: PAPPROV/CCR/FOV 2125 ppm: SA/CF 4250 ppm: GMFOV/SAF/SCBAF/SAT/CF 5000 ppm: SA/PD,PP Q: SCBAF/PD,PPISAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, giddy, stupor, no appetite, nau; darr; chem pneumonitis; unconsciousness	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash promptly Art resp Medical attention Irrmed	Skin, resp sys, PNS
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam/daily Change: After work it may be contam Remove: Promptly contam non-imperv		NIOSH ≥ SAF/PD,PP/ASCBA/SCBAF/PD,PP Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash Irrmed Art resp Medical attention Irrmed	Eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Hexachloronaphthalene $C_{12}H_4Cl_6$ 1335-87-1 QJ7350000	Halowax 1014	0.2 mg/m ³	2 mg/m ³	Light-yellow solid with an aromatic odor	MW: 335 BP: 850 to 730 °F Sol: Insoluble Not combustible	VP: < 1 mm MP: 279 °F	Strong oxidizers Filter; hexane; GC; H
Hexane $CH_3(CH_2)_4CH_3$ 110-54-3 MN9275000 1208 27	Hexyl hydride, Normal hexane, n-hexane	500 ppm (1800 mg/m ³) (NIOSH) 100 ppm 10-hr TWA 510 ppm 15-min cell (ACGIH) 50 ppm	5000 ppm	Colorless liquid with a mild gasoline-like odor	MW: 86 BP: 156 °F Sol: 0.014% F.P.: -7 °F IP: 10.18 eV	VP: 124 mm MP: -139 °F UEL: 7.5% LEL: 1.1%	Strong oxidizers Char; CS; GC; III
2-Hexanone $CH_3CO(CH_2)_3CH_3$ 591-78-6 MP1400000	Methyl butyl ketone, MBK, Butyl methyl ketone, Methyl n-butyl ketone	100 ppm (410 mg/m ³) (NIOSH) 1 ppm (4 mg/m ³) 10-hr TWA (ACGIH) 5 ppm	5000 ppm	Colorless liquid with a characteristic odor	MW: 100 BP: 262 °F Sol: 1.4% F.P.: 77 °F	VP: 3 mm MP: -71 °F UEL: 8% LEL: 1.2%	Strong oxidizers Char; CS; GC; III
Hexone $CH_3COCH_2C_2H_5$ 108-10-1 SA9275000 1245 26	4-Methyl-2-pentanone, Methyl isobutyl ketone, Isobutyl methyl ketone, MIBK	100 ppm (410 mg/m ³) (NIOSH) 50 ppm (200 mg/m ³) 10-hr TWA (ACGIH) 50 ppm	3000 ppm	Colorless liquid with a pleasant odor	MW: 100 BP: 244 °F Sol: 1.9% F.P.: 73 °F	VP: 15 mm MP: -119 °F UEL: 7.5% LEL: 1.4%	Strong oxidizers Char; CS; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: AP molt/RP liq sol/prob fumes Goggles: AP poss molt/rees sol liq Wash: Promptly upon contam/daily Change: After may be contam solid Remove: Immed molt/promptly sol liq non-imperv	OSHA 2 mg/m ³ : SA*/SCBA* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Acneform dermat, nau, confusion, jaundice, coma	Eye: Irr Skin: Immed Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Liver, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly prob Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: SA*/SCBA* 2500 ppm: SA:CF* 5000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head; nau; head; numb, musc weak; Irrit, eyes, nose; derm; chem pneumonia; giddiness	Eye: Irr Skin: Immed Soap wash Immed Breath: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys, lungs
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 10 ppm: SA/SCBA 25 ppm: SA:CF 50 ppm: SCBAF/SAF/SAT:CF 1000 ppm: SA:PD,PP* 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; peripheral neuropathy; weak, pares; derm; head; drow	Eye: Irr Skin: Immed Soap wash Immed Breath: Art resp Swallow: Medical attention immed	CNS, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 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 Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narcosis, coma; derm	Eye: Irr Skin: Immed Water flush promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
sec-Hexyl acetate C ₈ H ₁₆ O ₂ 108-84-9 SA7525000 1233 26	1,3-Dimethylbutyl acetate; Methylamyl acetate; Methylisoamyl acetate; Methylisobutyl carbinol	50 ppm (300 mg/m ³)	4000 ppm	Colorless liquid with a mild, pleasant fruity odor	MW: 144 BP: 285 °F Sol: 0.13% Fl.P: 113 °F	VP: 4 mm MP: -83 °F UEL: ? LEL: 0.9% (at Fl.P)	Nitrates, strong oxidizers, alkalis, and acids Char; CS ₂ ; GC; III
Hydrazine N ₂ H ₄ 302-01-2 MU7175000 2029 28	Hydrazine, anhydrous	1 ppm (1.3 mg/m ³) (NIOSH) 0.04 mg/m ³ 120-min cell See Appendix A (ACGIH) 0.1 ppm, A2	Ca	Colorless liquid with a weak, ammonia-like odor; can be solid <36 °F	MW: 32 BP: 236 °F Sol: Miscible Fl.P: 100 °F IP: 6.36 eV	VP: 10 mm MP: 36 °F UEL: 100% LEL: 4.7%	Oxidizers, hydrogen peroxide, nitric acid; metal oxides, strong acids; porous materials Bub (HCl) p-Dimethylaminobenzaldehyde; Color; III
Hydrogen bromide HBr 10035-10-6 MW3850000 1048 15	Anhydrous hydrobromic acid	3 ppm (10 mg/m ³) (ACGIH) 3 ppm cell (10 mg/m ³)	50 ppm	Colorless gas with an irritating, sharp odor; liquid under pressure	MW: 81 BP: -88 °F Sol: 194% Not combustible IP: 11.62 eV	VP: >1 atm MP: -124 °F	Strong oxidizers, strong caustics, metals, moisture SiO ₂ ; NaHCO ₃ ; IC; III
Hydrogen chloride HCl 7847-01-0 MW4025000 1050 15	Anhydrous hydrogen chloride; Hydrochloric acid, anhydrous	5 ppm cell (7 mg/m ³)	100 ppm	Colorless gas with an irritating, pungent odor	MW: 37 BP: -121 °F Sol: 82% Not combustible IP: 12.74 eV	VP: >1 atm MP: -173 °F	Most metals, alkali or active metals SiO ₂ ; NaHCO ₃ ; IC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 500 ppm: CCROV/SA/SCBA 1000 ppm: PAPROV/CCRFOV 1250 ppm: SA-CF 2500 ppm: GMFOV/SCBAF/SAF 4000 ppm: SAF-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Eye irrit, headache, narcosis	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention immed	CNS, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	NIOSH E: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; temp blind; dizz; nau; derm; burns skin, eyes; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	CNS, resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 50 ppm: SA-CF/PAPRAG GMFAG/SAF/SCBAF Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFAG/SCBAE	Ing Con	Eye, nose, throat irrit; skin, eye burns	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: pH<3:AP/pH>3:RP Goggles: Any poss Wash: pH<3:imm con/pH>3: pro wet Change: N.A. Remove: Non-imp:pH<3:imm con/ else pro wet Provide: pH<3:eyewash, quick drench	OSHA 50 ppm: SA/SCBA/CCRS/PAPRS 100 ppm: SA-CF/SAF/SCBAF Q: 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	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes

Hydrogen chloride

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Hydrogen cyanide (as CN) HCN 74-90-8 MW6825000 1613 55	Hydrocyanic acid, Prussic acid, Formonitrile	10 ppm (11 mg/m ³) (NIOSH) 5 mg/m ³ 10-min cell (4.7 ppm) (ACGIH) 10 ppm cell (10 mg/m ³)	50 ppm	Colorless or pale blue liquid or gas with a bitter almond odor	MW: 27 BP: 79°F Sol: Miscible FLP: 0°F IP: 13.89 eV	VP: 620 mm MP: 3 to 7°F UEL: 40% LEL: 5.6%	Bases, such as caustics, amines Filter/Bub (KOH); KOH; ISE; III
Hydrogen fluoride HF 7664-39-3 MW7875000 1052 15	Anhydrofluoric acid, HF-A	3 ppm (NIOSH) 3 ppm 10-hr TWA 6 ppm 15 min cell (ACGIH) 3 ppm cell	30 ppm	Colorless, fuming liquid or gas with a strong, irritating odor	MW: 20 BP: 67°F Sol: Miscible Not combustible IP: 16.01 eV	VP: 760 mm MP: -118°F	Metals, concrete, glass, ceramics SiO ₂ ; NaHCl; IC; III
Hydrogen peroxide H ₂ O ₂ 7722-84-1 MX0900000 2015 47	High-strength hydrogen peroxide, Peroxide, Hydrogen dioxide	1 ppm (1.4 mg/m ³)	75 ppm	Colorless liquid with a slightly sharp odor	MW: 34 BP: 286°F Sol: Miscible Not combustible, but powerful oxidizer IP: 11 eV	VP(86°F): 5 mm MP: 12°F	Oxidizable materials; iron, copper, brass, bronze, chromium, zinc, lead, manganese, silver, catalytic metals —
Hydrogen selenide H ₂ Se 7783-07-5 MX1050000 2202 16	Selenium hydride	0.05 ppm (0.2 mg/m ³)	2 ppm	Colorless gas with a very offensive odor	MW: 81 BP: -42°F Sol: 0.7% FLP: N.A. IP: 9.88 eV	VP: >1 atm MP: -87°F UEL: ? LEL: ?	Oxidizers, acids, water, halogenated hydrocarbons —

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet Immed (flamm) Provide: Eyewash, quick drench	NIOSH 47 ppm: SA/SCBA 50 ppm: SA:CF/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape:GMFS/SCBAE	Inh Abs Ing Con	Asphyxia & death at high levels; weak; head; confusion; nau, vomit; increase rate & depth of respiration or resp slow & gasping	Eye: Irr Immed Skin: Water flush immed Breath: Art res/puse Amyl Nitrite Pearls Swallow: Medical attention immed	CNS, CVS, liver, kidneys
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 30 ppm: SA*/SCBA*/ PAPRS*/CCRS*/GMFS Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Eye, nose, throat Irrit; pulm edema; skin, eye burns; nasal congestion; bron	Eye: Irr Immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 10 ppm: SA*/SCBA* 25 ppm: SA:CF* 50 ppm: SCBAF/SAF 75 ppm: SAF:PD,PP Q: 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: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA:CF* 2 ppm: SCBAF/SAF Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS*/SCBAE	Inh Con	Irrit eyes, nose, throat; nau, vomit, diarr; metal taste, garlic breath; dizz; lassa, fig	Breath: Art resp	Resp sys, eyes

Chemical Name, Formula, CAS, RECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Hydrogen sulfide H ₂ S 7783-06-4 MX1225000 1053 13	Sulfuretted hydrogen, Hydro-sulfuric acid, Hepatic gas	20 ppm cell 50 ppm 10-min peak (NIOSH) 10 ppm 10-min cell (ACGIH) 10 ppm	300 ppm	Colorless gas with a strong odor of rotten eggs; liquid at high pressure, low temperature	MW: 34 BP: -76°F Sol: 2.9% F.L.P: N.A. IP: 10.43 eV	VP: 20 atm MP: -117°F UEL: 46% LEL: 4.3%	Strong oxidizers, metals Imp (CoOH); Chem; spectro; A
Hydroquinone C ₆ H ₄ O ₂ 123-31-9 MX3500000 2662 53	Quinol; 1,4-Dihydroxybenzene; 1,4-Benzenediol	2 mg/m ³ (NIOSH) 2 mg/m ³ 15-min cell	200 mg/m ³	Light tan, light gray, or colorless crystals	MW: 110 BP: 547°F Sol: 7% F.L.P: 329°F	VP: <0.001 mm MP: 338°F UEL: ? LEL: ?	Strong oxidizers Filter; acids; HPLC III
Iodine I ₂ 7553-56-2 NN1575000	None	0.1 ppm cell (1 mg/m ³)	10 ppm	Violet solid with a sharp, character- istic odor	MW: 254 BP: 363°F Sol: 0.03% Not combustible IP: 9.37 eV	VP: 0.3 mm MP: 237°F	Gaseous or aqueous ammonia, acetylene, acetaldehyde, powdered aluminum, active metals —
Iron oxide fume Fe ₂ O ₃ 1309-37-1 NO7400000 1376 37	Ferric oxide fume	10 mg/m ³ (ACGIH) 5 mg/m ³	N.A.	Red-brown fume with a metallic taste	MW: 160 BP: N.A. Sol: Insoluble Not combustible	VP: 0 mm MP: 2850°F	Calcium hypochloride Filter; acid; AA; O

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	NIOSH 100 ppm: SA/SCBA* 250 ppm: SA/CF* 300 ppm: SCBAF/SAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Apnea; coma, convuls; Irrit eyes, conj pain, lac, photophobia, conj vesic; irrit resp sys; dizz; head; tfg; insom; GI	Eye: Skin: Breath:	Irr immed Water flush immed Art resp	Resp sys, eyes
Clothing: Repeat prolong Goggles: Any poss > 7%/ Reas prob < 7% Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv Provide: Eyewash > 7%	NIOSH 50 mg/m ³ : PAPRD* 100 mg/m ³ : HIEF/SCBAF/ SAF/PAPRTHIE/SAT/CF 200 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, conj kera; excitement; colored urine; nau; dizz; suffocation, rapid breath- ing; musc twitch, delirium; collapse	Eye: Skin: Breath: Swallow:	Irr immed (15 min) Water flush Fresh air Medical attention immed	Eyes, resp sys, skin, CNS
Clothing: AP>7%/RP<7% Goggles: AP>7%/Reas<7% Wash: Imm contam >7%/pro <7% Change: N.A. Remove: Non-imperv Imm contam >7%/pro wet <7% Provide: >7% eyewash, quick drench	OSHA 1 ppm: SA/SCBA* 2.5 ppm: SA/CF* 5 ppm: SAF/SCBAF 10 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEAG/SCBAE	Inh Ing Con	Irrit eyes, nose; lac; head; tight chest; skin burns, rash; cutaneous hypersensitivity; burn mouth; vomit; abdom pain; diarr	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	Resp sys, eyes, skin, CNS, CVS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 50 mg/m ³ : DMFu/SA/SCBA 125 mg/m ³ : PAPRDMFuSA/CF 250 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT/CF 5000 mg/m ³ : SA/PD,PP 7500 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIE/SCBAE	Inh	Benign pneumoconiosis; X-ray shadows indistinguishable from fibrotic pneumoconiosis	Breath:	Art resp	Resp sys

Iron oxide fume

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Isoamyl acetate $C_7H_{14}O_2$ 123-82-2 NS9800000	3-Methyl-1-butanol acetate, Banana oil, 2-Methylbutyl ethanoate	100 ppm (525 mg/m ³)	3000 ppm	Clear, colorless liquid with a banana-like odor	MW: 130 BP: 204 °F Sol: 0.2% Fl.P: 77 °F	VP: 4 mm MP: -148 °F UEL: 7.5% LEL(212 °F): 1%	Nitrates; strong oxidizers, alkalies, and acids Char; CS; GC; III
Isoamyl alcohol $(CH_3)_2CHCH_2CH_2OH$ 123-51-3 EL5425000 1105 26	3-Methyl-1-butanol, isobutylicarbinol, isopentyl alcohol, Fermentation amyl alcohol, Fusel oil	100 ppm (360 mg/m ³)	8000 ppm	Colorless liquid with an alcoholic odor which causes coughing	MW: 88 BP: 270 °F Sol: 2.4% Fl.P: 109 °F	VP: 2 mm MP: -179 °F UEL(212 °F): 9% LEL(212 °F): 1.2%	Strong oxidizers Char; 2-Propanol in CS; GC; III
Isobutyl acetate $CH_3COOCH_2CH(CH_3)_2$ 110-19-0 AI4025000 1213 26	2-Methylpropyl acetate, beta-Methylpropyl ethanoate, Acetic acid isobutyl ester	150 ppm (700 mg/m ³)	7500 ppm	Clear, colorless liquid with a pleasant, fruity odor	MW: 116 BP: 243 °F Sol: 0.67% Fl.P: 84 °F IP: 9.97 eV	VP: 13 mm MP: -143 °F UEL: 10.5% LEL: 2.4%	Nitrates; strong oxidizers, alkalies, and acids Char; CS; GC; III
Isobutyl alcohol $(CH_3)_2CHCH_2OH$ 78-83-1 NP9825000 1212 26	Isobutanol, IBA, 2-Methyl-1-propanol, isopropylcarbinol	100 ppm (300 mg/m ³) (ACGIH) 50 ppm (150 mg/m ³)	8000 ppm	Colorless liquid with a mild, non-residual odor	MW: 74 BP: 226 °F Sol: 6.7% Fl.P: 82 °F IP: 10.09 eV	VP: 9 mm MP: -162 °F UEL(212): 10.9% LEL(212): 1.2%	Strong oxidizers Char; 2-Propanol in CS; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: CCROV/PAPROV/SA/SCBA 2500 ppm: SA:CF 3000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; derm	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 1000 ppm: CCRFOV/PAPROV- 2500 ppm: SA:CF- 5000 ppm: SCBAF/SAF/GMFOV 8000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narcosis; head, dizz; dysp, nau, vomit, diarr; skin cracking	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: PAPROV/CCRFOV 3750 ppm: SA:CF- 7500 ppm: SCBAF/SAF/GMFOV Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head; drow; irrit eyes, upper resp, skin; anes	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Skin, eyes, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	ACGIH 500 ppm: SA/SCBA/CCRFOV* 1000 ppm: PAPROV/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 8000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, throat; head; drow; skin irrit, cracking	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Isophorone $C_{10}H_{18}O$ 78-56-1 GW7700000	3,5,5-Trimethyl-2-cyclohexene-1-one	25 ppm (140 mg/m ³) (NIOSH) 23 mg/m ³ 10-hr TWA (4 ppm) (ACGIH) 5 ppm cell	800 ppm	Colorless or pale liquid with a camphor-like odor	MW: 138 BP: 419°F Sol: 1.2% F.L.P: 184°F	VP: 0.2 mm MP: 17°F UEL: 3.8% LEL: 0.8%	Strong oxidizers Char; CS ₂ ; GC; III
Isopropyl acetate $CH_3COOCH(CH_3)_2$ 108-21-4 AI4930000 1220 26	Isopropyl ester of acetic acid, sec-Propyl acetate	250 ppm (950 mg/m ³)	16,000 ppm	Colorless liquid with a fruity odor	MW: 102 BP: 194°F Sol: 2.9% F.L.P: 40°F IP: 9.96 eV	VP: 43 mm MP: -92°F UEL: 8% LEL: 1.8%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; E
Isopropyl alcohol $CH_3CHOHCH_3$ 67-63-0 NT8060000 1219 26	Isopropanol, IPA, 2-Propanol, sec-Propyl alcohol	400 ppm (980 mg/m ³) (NIOSH) 400 ppm 10-hr TWA 800 ppm 15-min cell	12,000 ppm	Colorless liquid with an odor of rubbing alcohol	MW: 60 BP: 180°F Sol: Miscible F.L.P: 53°F IP: 10.15 eV	VP: 33 mm MP: -128°F UEL: 12% LEL: 2%	Strong oxidizers Char; 2-Butanol in CS ₂ ; GC; III
Isopropylamine $(CH_3)_2CHNH_2$ 75-31-0 NT8400000 1221 68	Monoisopropylamine, 2-Aminopropane	5 ppm (12 mg/m ³)	4000 ppm	Colorless liquid with a pungent, ammonia-like odor	MW: 59 BP: 90°F Sol: Miscible F.L.P: -35°F IP: 8.72 eV	VP: 478 mm MP: -139°F UEL: 10.4% LEL: 2.0%	Strong acids and oxidizers Bub; H ₂ SO ₄ ; GC; K

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv Provide: Eyewash	NIOSH 40 ppm: SA/SCBA/ICPROV* 100 ppm: SA/CF/PAPROV* 200 ppm: GMFOV/SCBAF/SAF/ PAPRTOV/SAT/CF* 800 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; narco; derm; head; dizz	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Resp sys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 6250 ppm: SA/CF- 12,500 ppm: SCBAF/SAF 18,000 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; narcosis; derm; skin irrit	Eye: Skin: Breath: Swallow: Irr immed Water flush promptly Art resp Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Repeat prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: PAPROV/ICRFOV 10,000 ppm: SA/CF- 12,000 ppm: GMFOV/SCBAF/SAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Mild irrit eyes, nose, throat; drow; dizz; head; dry cracking skin; GI cramps; nau, diarr	Eye: Skin: Breath: Swallow: Irr immed Water flush Art resp Medical attention immed	Eyes, skin, resp sys
Clothing: Reason prob Goggles: Any poss Wash: Immed upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 125 ppm: SA/CF/PAPRS* 250 ppm: CCRSF/GMFS/SCBAF/ SAF/PAPRTS* 4000 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, skin; pulm edema; vis dist; skin, eye burns; derm	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	Resp sys, skin, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Isopropyl ether ($(\text{CH}_3)_2\text{CH}_2\text{O}$) 108-20-3 TZ5425000 1159 28	Diisopropyl ether, 2-Isopropoxy propane	500 ppm (2100 mg/m ³) (ACGIH) 250 ppm (1050 mg/m ³)	10,000 ppm	Colorless liquid with a sharp, sweet, ether-like odor	MW: 102 BP: 156°F Sol: 0.2% Fl.P: -18°F IP: 9.20 eV	VP: 119 mm MP: -121°F UEL: 7.9% LEL: 1.4%	Strong oxidizers Char; CS _x ; GC; V
Isopropyl glycidyl ether $\text{C}_8\text{H}_{14}\text{O}_2$ 4018-14-2 TZ3500000	Isopropoxymethyl-oxiran; 1,2-Epoxy-3-isopropoxypropane; isopropyl epoxypropyl ether; IGE	50 ppm (240 mg/m ³) (NIOSH) 50 ppm 15-min call	1500 ppm	Colorless liquid	MW: 116 BP: 270°F Sol: 19% Fl.P: 92°F	VP(77°F): 9.4 mm MP: ? UEL: ? LEL: ?	Strong oxidizers and caustics Char; CS _x ; GC; F
Ketene CH_2CO 463-51-4 OA7700000	Carbomethene, Ethenone	0.5 ppm (0.9 mg/m ³)	50 ppm	Colorless gas with a sharp odor	MW: 42 BP: -89°F Sol: Reacts Fl.P: N.A. IP: 9.84 eV	VP: N.A. MP: -239°F UEL: ? LEL: ?	Water, variety organic compounds Sub (hydroxyl-ammonium chloride); FeCl ₃ ; Color; G
Lead, inorganic fumes and dusts (as Pb) Pb 7439-92-1 OF7525000 2291 53	Synonyms vary depending upon specific compound	0.05 mg/m ³ (Feb. 1979) (NIOSH) <0.1 mg/m ³ 10-hr TWA	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers, hydrogen peroxide, active metals; sodium, potassium	Filter; HNO ₃ ; AA or ICP; O

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed	ACGIH 1000 ppm: PAPROV/CCROV* 2500 ppm: SA/SCBA* 8250 ppm: SA,CF* 10,000 ppm: SAF/SCBAF/GMFOV Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; resp discomfort; derm in animals; drowsy, dizz, unconsciousness	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Resp sys, skin	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 1250 ppm: SA,CF* 1500 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp, skin; skin sens	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys	
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 12.5 ppm: SA,CF* 25 ppm: SCBAF/SAF 50 ppm: SAF: PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Irrit eyes, nose, throat, lungs; pulm edema	Breath: Art resp	Resp sys, eyes, skin	
Clothing: Repeat prolong Goggles: Reason prob Wash: Daily Change: N.A. Remove: Promptly contam non-imperv	OSHA 0.5 mg/m ³ : SA/HIE/SCBA 1.25 mg/m ³ : PAPRHIE/SA:CF 2.5 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 50 mg/m ³ : SA:PD,PP 100 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Less; insom; pal, eye grounds; anor, low-wrgt, malnut; consti, abdom pain, colic; hypotense; anemia; gingival lead line; trem, para wrist	Eye: Irr Immed Skin: Soap flush promptly Breath: Art resp Swallow: Medical attention Immed	GI tract, CNS, kidneys, blood, gingival tissue	

Lead, inorganic fumes and dusts (as Pb)

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Lead arsenate Pb ₃ (AsO ₄) ₃ 3687-31-8 CG0990000	Synonyms vary depending upon specific compound	0.05 mg/m ³ (as lead) (NIOSH) 2 µg/m ³ 15-min cell (as arsenic) See Appendix A	Ca	Odorless, colorless solid	Properties vary depending upon specific compounds	None hazardous	—
1817 53							
Lindane C ₆ H ₆ Cl ₆ 58-89-9 GV4900000	1,2,3,4,5,6-Hexachloro-cyclohexane; gamma-Hexachlorocyclohexane; Benzene hexachloride	0.5 mg/m ³	1000 mg/m ³	Colorless solid with a musty odor (pure material is odorless)	MW: 291 BP: Decomposes Sol: 0.001% Not combustible	VP: 9.4 × 10 ⁻⁴ mm MP: 234°F May be dissolved in combustible solvent	Filter/Sub iso-octane; GC; III
2781 55							
Lithium hydride LiH 7580-87-8 OJ8300000	None	0.025 mg/m ³	55 mg/m ³	Off-white, translucent solid, odorless	MW: 8 BP: Decomposes Sol: Reacts F.P.: N.A.	VP: 0 mm MP: 1267°F UEL: N.A. LEL: N.A.	Oxidizers, halogenated hydrocarbons, acids, water
1414 40							
LPG 68476-85-7 SE7545000	Liquefied petroleum gas, Bottled gas	1000 ppm (1800 mg/m ³)	19,000 ppm	Colorless, odorless gas (foul-smelling odorant added)	MW: 42 to 58 BP: -40 to 31°F Sol: Insoluble F.P.: N.A. IP: 10.95 eV	VP: 2.1 to 8.5 atm MP: ? UEL: 9.5% LEL: 1.9%	Strong oxidizers Combustible gas meter; G
1075 22							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: N.A. Wash: Daily Change: After work any poss contam Remove: Promptly contam non-imperv	NIOSH E: SCBAF:PD,PP/SAF:PD,PP: ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Arsenic intoxic; nau, diarr; inflamm muc memb, skin; pig; lead intoxic; abdom pain, low-ap, const; tired, weak, ner, neur; paresthesia; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	GI tract, CNS, kidneys, blood, gingival tissue, lymphatics, skin
Clothing: Reason prob Goggles: N.A. Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam liq non-imperv Provide: Quick drench	OSHA 5 mg/m ³ : CCROVDMFu/SA/SCBA 12.5 mg/m ³ : PAPROVDMFu/SA:CF ^a 25 mg/m ³ : CCROVFHIE/SCBAF/SAF/ GMFHIEOV/PAPRTOVHIE ^a 500 mg/m ³ : SA:PD,PP ^a 1000 mg/m ³ : SAF:PD,PP 1: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head; nau; clonic convul; resp probs; cyan; aplastic anemia; skin ir- rit; musc spasma	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, CNS, blood, liver, kidneys, skin
Clothing: AP/FP air 0.1 > mg/m ³ Goggles: Any poss Wash: Immed brush contam, wash Change: After work any poss contam Remove: Any contam immed Provide: Eyewash/> 0.5 mg/m ³ quick drench	OSHA 0.25 mg/m ³ : SA/SCBA/HIE 0.625 mg/m ³ : SA:CF/PAPRHIE ^a 1.25 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE ^a 50 mg/m ³ : SAF:PD,PP 2: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Burns eyes, skin, mouth, esophagus; nau; musc twitches; mental confu- sion; blurring vision	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	OSHA 10,000 ppm: SA/SCBA 19,000 ppm: SA:CF/SCBA/SAF/SAT:CF 2: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	LI-head, drowsy	Eye: Irr immed Skin: Water flush immed Breath: Art resp	Resp sys, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Magnesium oxide fume MgO 1309-48-4 OM3850000 1418 40	Magnesia fume	15 mg/m ³ (ACGIH) 10 mg/m ³	N.A.	White fume	MW: 40 BP: 6480 °F Sol: Insoluble Not combustible	Chlorine trifluoride	Filter; HNO ₃ ; AA; O	
Malathion C ₁₀ H ₁₆ O ₆ PS ₂ 121-75-5 WMB400000 2783 55	o,o-Dimethyl dithiophosphate of diethyl mercaptosuccinate; o,o-Dimethyl S-(1,2-dicarbethoxy-ethyl) phosphoro-dithioicite	15 mg/m ³ (NIOSH) 15 mg/m ³ 10-hr TWA (ACGIH) 10 mg/m ³	5000 mg/m ³	Colorless to brown liquid with a mild skunk-like odor	MW: 330 BP: Decomposes Sol: 0.0145% Not combustible	Strong oxidizers	Filter; iso-octane; GC; III	
Maleic anhydride (CHCO) ₂ O 108-31-6 ON3675000 2215 80	2,5-Furandione; cis-Butenedioic anhydride; Toxicic anhydride	0.25 ppm (1 mg/m ³)	N.A.	Colorless or white solid with a penetrating odor	MW: 98 BP: 396 °F Sol: Insoluble Fl.P: 215 °F	VP: 0.16 mm MP: 127 °F UEL: 7.1% LEL: 3.4%	Strong oxidizers; alkali metals, caustics, amines at > 150 °F	—
Manganese and compounds (as Mn) Mn 7439-96-5 OO9275000	Synonyms vary depending upon specific compound	5 mg/m ³ ceil (ACGIH) 5 mg/m ³ ceil (dust) 1 mg/m ³ (fume)	10,000 mg/m ³	Gray solid	MW: 55 BP: 3806 °F Sol: ? Fl.P: ?	VP(2240 °F): 1 mm MP: 2273 °F UEL: ? LEL: ?	Variable	Filter; HCl; AA; A

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 100 mg/m ³ : DMFu/SA/SCBA 250 mg/m ³ : SA:CF/PAPRDMFu 500 mg/m ³ : HIEF/SCBAF/SAF/ PAPRTHIE ¹ 7500 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, nose; flu-like fever; cough, chest pain (metal fume fvr)	Breath: Art resp	Resp sys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH 150 mg/m ³ : SA/SCBA/CCROVDMFu 375 mg/m ³ : SA:CF/PAPROVDMFu ⁴ 750 mg/m ³ : SAF/SCBAF/CCRFOVHIE/ GMFHIEOV/PAPRTOVHIE ⁴ /SAT:CF ⁴ 5000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Inh Con	Miosis; eye, skin irrit; rhin; head; tight chest, wheez, tar spots; saliv; anor, nau, vomit, abdom cramp, diarr; atax	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, liver, blood cholinesterase, CNS, CVS, GI
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv Provide: Eyewash	OSHA 6.25 ppm: SA:CF ⁴ 12.5 ppm: SAF/SCBAF 500 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Inh Con	Conj; photophobia, double vision; nas, upper resp irrit; bron, aath; derm	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 50 mg/m ³ : DM ⁴ /SA/SCBA 125 mg/m ³ : PAPRDM ⁴ /SA:CF 250 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT: CF 5000 mg/m ³ : SA:PD,PP 7500 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Inh	Parkinson's; asthenia, insom, mental; metal fume fvr; dry throat, cough, tight chest, dysp, rales; lo-back pain; vomit, mal; Itg	Breath: Art resp Swallow: Medical attention immed	Resp sys, CNS, blood, kidneys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Mercury and in-organic compounds (as Hg) Hg 7439-97-8 OV4550000 2024 53 2025 53 2809 60	Quicksilver	0.1 mg/m ³ cell (NIOSH) 0.05 mg/m ³ 10-hr TWA (ACGIH) 0.05 mg/m ³	28 mg/m ³	Silvery, mobile odorless liquid	MW: 201 BP: 674°F Sol: 0.002% Not combustible	VP: 0.0012 mm MP: -38°F	Acetylenes, ammonia gases Ads, thermal desorp: AA: III
Mercury, (organo) alkyl compounds (as Hg)	Synonyms vary depending upon specific compound	0.01 mg/m ³ 0.04 mg/m ³ cell	10 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers, such as chlorine	NIOSH 77-157A
2003 40							
Mesityl oxide CH ₃ COCH = C(CH ₃) ₂ 141-79-7 SB4200000 1229 28	4-Methyl-3-pentan-2-one, isobutanyl methyl ketone, Methyl isobutanyl ketone, Isopropylidene acetone	25 ppm 100 mg/m ³ (NIOSH) 10 ppm (40 mg/m ³) 10-hr TWA (ACGIH) 15 ppm	5000 ppm	Clear, pale yellow, or colorless liquid with a strong peppermint odor	MW: 98 BP: 266°F Sol: 3% Fl.P: 87°F IP: 9.08 eV	VP: 8 mm MP: -51°F UEL: ? LEL: 1.4%	Oxidizers Char; CH ₃ OH; GC III
Methoxychlor C ₁₀ H ₁₁ Cl ₃ O ₂ 72-43-5 KJ3675000 2761 55	2,2-bis(p-Methoxyphenyl)-1,1,1-Trichloroethane	15 mg/m ³ (ACGIH) 10 mg/m ³	7500 mg/m ³	Colorless to tan solid with a slight, fruity odor	MW: 346 BP: Decomposes Sol: 0.01% Fl.P: N.A.	VP: Very low MP: 172 to 187°F UEL: N.A. LEL: N.A.	Strong oxidizers Filter; iso-octane; GC; Set 5

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	See Appendix B	Inh Abs Con	Cough, dysp, bron preu; tremor; insom; irrity, indocision; head; ftg, weak; stomatitis; sair; GI, anor, lo-wt; prot; Irrit eyes, skin	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Skin, resp sys, CNS, kidneys, eyes
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 0.1 mg/m ³ : SA/SCBA 0.25 mg/m ³ : SA:CF 0.5 mg/m ³ : SAF/SCBAF/SAT:CF 10 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Pares, atax, dysart; vision, hearing; emotions; spastic, jerky; dizz; hypersair; lac; nau, vomit, diarr, const; derm	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	CNS, kidneys, eyes, skin
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	NIOSH 250 ppm: SA:CF*/PAPROV* 500 ppm: CCRFOV/GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; narco, coma	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, resp sys, CNS
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 100 mg/m ³ : CCROVDMFu/SA/SCBA 250 mg/m ³ : SA:CF/PAPROVDMFu 500 mg/m ³ : CCRFOVHIE/SAF/ PAPRTOVHIE/SCBAF/GMFHIEOV/SAT:CF 7500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing	None known in humans; in animals: trembling, convul; kidney, liver damage	Skin: Soap wash Breath: Fresh air Swallow: Medical attention Immed	None known

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methyl acetate CH ₃ COOCH ₃ 79-20-9 A19100000 1231 26	Acetic acid, methyl ester; Methyl acetic ester; Methyl ethanoate	200 ppm (810 mg/m ³)	10,000 ppm	Colorless liquid with a fruity odor	MW: 74 BP: 135°F Sol: 24.5% Fl.P: 14°F IP: 10.27 eV	VP: 173 mm MP: -144°F UEL: 16% LEL: 3.1%	Nitrates; strong oxidizers, alkalies, and acids Char; CS; GC; D
Methyl acetylene C ₂ H ₂ 74-99-7 UK4250000	Propyne, Allylene	1000 ppm (1850 mg/m ³)	17,000 ppm based on LEL	Colorless gas with a sweet odor	MW: 40 BP: -10°F Sol: Insoluble Fl.P: N.A. IP: 10.36 eV	VP: 3600 mm MP: -153°F UEL: 11.7% LEL: 1.7%	Strong oxidizers, chlorine, copper, copper alloys Bag (none); GC; Set 6
Methyl acetylene-propadiene mixture UK4920000 1060 17	MAPP gas, Methyl acetylene-allene mixture, Propyne-allene mixture	1000 ppm (1800 mg/m ³)	20,000 ppm	Colorless gas with a strong, characteristic, foul odor	MW: 40 BP: -36 to -4°F Sol: Insoluble Fl.P: N.A.	VP: > 1 atm MP: ? UEL: 11% LEL: 3.4%	Strong oxidizers, copper alloys (>87% Cu) NIOSH 80-125
Methyl acrylate CH ₂ CHCOOCH ₃ 96-33-3 AT2800000 1919 27	Methyl propenoate	10 ppm (35 mg/m ³)	1000 ppm	Clear, colorless liquid with a sharp, sweet, fruity odor	MW: 86 BP: 176°F Sol: 5.5% Fl.P: 13°F IP: 9.19 eV	VP: 68.2 mm MP: -130°F UEL: 25% LEL: 2.8%	Nitrates, oxidizers, peroxides, polymerizers, strong alkalies, moisture Char; CS; GC; D

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 1000 ppm: CCROV*/PAPROV* 2000 ppm: SA*/SCBA* 5000 ppm: SA:CF* 10,000 ppm: GMFOV/SCBAF/SAF Q: 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 promptly Art resp Swallow: Medical attention Immed	Resp sys, skin, eyes	
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet Immed (flamm)	OSHA 10,000 ppm: SA/SCBA 11,000 ppm: SA:CF/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Drow, unconsciousness	Breath: Art resp	CNS	
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet Immed (flamm)	OSHA 10,000 ppm: SA/SCBA 17,000 ppm: SA:CF/SAF/SCBAF SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Frostbite, disorientation, drowsy, unconsciousness	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp	CNS, skin, eyes	
Clothing: Any poss Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Any wet Immed (flamm) Provide: Quick drench	OSHA 100 ppm: SA*/SCBA* 250 ppm: SA:CF* 500 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Irrit eyes, upper resp, skin	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methylal <chem>CH2OCH2OCH3</chem> 109-87-5 PA8750000 1234 26	Dimethoxymethane, Methyl formal, Formal, Dimethylacetal formaldehyde	1000 ppm (3100 mg/m ³)	10,000 ppm	Colorless liquid with a pungent odor	MW: 76 BP: 111°F Sol: 33% Fl.P(oc): 0°F IP: 10.00 eV	VP: 330 mm MP: -157°F UEL: 17.6% LEL: 1.6%	Strong oxidizers, acids Char; hexane; GC; F
Methyl alcohol <chem>CH3OH</chem> 87-56-1 PC1400000 1230 28	Methanol, Wood alcohol, Columbian spirits, Carbinol	200 ppm (200 mg/m ³) (NIOSH) 200 ppm 10-hr TWA 800 ppm 15-min cell	25,000 ppm	Colorless liquid with a characteristic pungent odor	MW: 32 BP: 148°F Sol: Miscible Fl.P: 52°F IP: 10.84 eV	VP: 97 mm MP: -144°F UEL: 36% LEL: 6.7%	Strong oxidizers SiO ₂ ; water; GC; III
Methylamine <chem>CH3NH2</chem> 74-89-5 PFS300000 1061 19	Monomethylamine, Anhydrous methylamine	10 ppm (12 mg/m ³)	100 ppm	Colorless gas with an ammonia-like odor, at low concentrations fishy odor, liquid under pressure	MW: 31 BP: 21°F Sol(77°F): 959 cc/ 100 ml Fl.P: N.A. IP: 8.97 eV	VP: N.A. MP: -136°F UEL: 21% LEL: 5%	Mercury, strong oxidizers --
Methyl (n-amy) ketone <chem>CH3COC6H13</chem> 110-43-0 MJ5075000 1110 26	n-Amyl methyl ketone, 2-Heptanone	100 ppm (465 mg/m ³) (NIOSH) 100 ppm (465 mg/m ³) 10-hr TWA (ACGIH) 50 ppm	4000 ppm	Clear, colorless liquid with a mild, banana oil-like odor	MW: 114 BP: 304°F Sol: 0.43% Fl.P(oc): 120°F IP: 9.33 eV	VP: 2 mm MP: -31°F UEL: 7.9% LEL: 1.1%	Strong acids, alkalies, oxidizers Char; CH ₃ OH; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	OSHA 10,000 ppm: SA/SCBA Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Mild irrit eyes, upper resp; anesthesia; irrit skin	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Skin, resp sys, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 2000 ppm: SA/SCBA 5000 ppm: SA:CF 10,000 ppm: SCBAF/SAF/SAT:CF 25,000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: SCBAE	Inh Ing Con	Eye irrit, head, drowsy, II-head, nau, vomit, vis dist, eye burns, digestive dist, failure of vision	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Eyes, skin, CNS, GI tract
Clothing: Any poss (liq) Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet Immed (flamm) Provide: Eyewash, quick drench	OSHA 100 ppm: SCBAF/SAF/ CCRSF/GMFS/PAPRS* Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Abe Ing Con	Irrit eyes, resp sys; cough; burns; derm, conj	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any contam	NIOSH 1000 ppm: CCROV*/SA/ SCBA*/PAPROV* 2500 ppm: SA:CF* 4000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narcoais, coma; derm	Eye: Irr Immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention Immed	Eyes, skin, resp sys, CNS, PNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methyl bromide CH ₃ Br 74-83-9 PA4900000 1062 55	Bromomethane	20 ppm cell (80 mg/m ³) (NIOSH) lowest feasible limit See Appendix A (ACGIH) 5 ppm	Ca	Colorless liquid or gas with a chloroform-like odor at high concentration	MW: 95 BP: 38°F Sol: < 0.1% F.P.: ? IP: 10.54 eV	VP: 1.8 atm MP: -137°F UEL: 14.5% LEL: 13.5%	Aluminum, strong oxidizers Char, CS; GC; J
Methyl cellosolve CH ₃ OCH ₂ CH ₂ OH 109-86-4 KL5775000 1188 26	2-Methoxyethanol, Glycol monomethyl ether, Ethylene glycol monomethyl ether, Methyl oxitol, Ektasolve, Jeffersol EM	25 ppm (80 mg/m ³) (NIOSH) lowest feasible limit (ACGIH) 5 ppm (16 mg/m ³)	*	Colorless liquid with a mild, non-residual odor	MW: 78 BP: 258°F Sol: Miscible F.P.: 107°F	VP: 8 mm MP: -121°F UEL: 19.8% LEL: 2.5%	Strong oxidizers and caustics Char, CH ₃ OH/ CH ₂ Cl ₂ ; GC; III
Methyl cellosolve acetate C ₆ H ₁₂ O ₅ 110-49-6 KL5950000 1189 26	2-Methoxyethyl acetate, Glycol monomethyl ether acetate, Ethylene glycol monomethyl ether acetate	25 ppm (120 mg/m ³) (ACGIH) 5 ppm (24 mg/m ³)	4000 ppm	Colorless liquid with a mild, ether-like odor	MW: 118 BP: 293°F Sol: Miscible F.P.: 111°F	VP: 2 mm MP: -85°F UEL: 8.2% LEL: 1.1%	Nitrates; strong oxidizers, alkalies, and acids Char, CS; GC; D
Methyl chloride CH ₃ Cl 74-87-3 PA6300000 1063 18	Chloromethane	100 ppm 200 ppm cell 300 ppm 5 min/3-hr peak (NIOSH) Lowest feasible limit See Appendix A (ACGIH) 50 ppm	Ca	Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations	MW: 51 BP: -12°F Sol: Insoluble F.P.: N.A. IP: 11.26 eV	VP: 4.8 atm MP: -144°F UEL: 19% LEL: 7.6%	Chemically active metals: potassium, powdered aluminum, zinc, magnesium Char, CH ₂ Cl ₂ ; GC; Set 2

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Any poss Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; vis dist; vertigo; nau, vomit, malaise; hand tremor; convuls; dysp; irrit eyes; skin irrit, vesiculation; [carc]	Eye: Irr Immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention Immed	CNS, resp sys, skin, eyes	
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, drowsy, weak, ataxia, tremor, som, anemic pallor, irrit eyes	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	CNS, blood, skin, eyes, kidneys	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	ACGIH 50 ppm: SA*/SCBA* 125 ppm: SA:CF 250 ppm: SCBAF/SAF 4000 ppm: SA:PD,PP* G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Kidney damage, brain damage, eye irrit	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Kidneys, brain, CNS, PNS	
Clothing: Prevent wet or freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	NIOSH E: 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: Irr Immed Skin: Water flush immed Breath: Art resp	CNS, liver, kidneys, skin	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methyl chloroform <chem>CH2Cl3</chem> 71-55-8 KJ2975000 2831 74	1,1,1-Trichloroethane; 1,1,1-Trichloroethane, stabilized	350 ppm (1900 mg/m ³) (NIOSH) 350 ppm 15-min ceil	1000 ppm	Colorless liquid with a mild, chloroform-like odor	MW: 133 BP: 165°F Sol: 0.07% F.P.: None	VP: 100 mm MP: -36°F UEL: 15% LEL: 7%	Strong caustics, strong oxidizers, chemically active metals, such as aluminum, magnesium powders, sodium, potassium Char; CS; GC; III
Methyl chloromethyl ether—See Chloromethyl methyl ether							
Methylcyclohexane <chem>CH2C6H11</chem> 108-67-2 GV6125000 2298 27	Cyclohexylmethane, Hexahydrotoluene	500 ppm (2000 mg/m ³) (ACGIH) 400 ppm (1800 mg/m ³)	10,000 ppm	Colorless liquid with a faint, benzene-like odor	MW: 98 BP: 214°F Sol: Insoluble F.P.: 25°F IP: 9.85 eV	VP: 37 mm MP: -196°F UEL: 6.7% LEL: 1.2%	Strong oxidizers Char; CS; GC; G
Methylcyclohexanol <chem>CH2C6H11OH</chem> 25639-42-3 GW0175000 2617 26	Hexahydrocresols; mixture of 2-,3-, and 4-Methylcyclohexanols	100 ppm (470 mg/m ³) (ACGIH) 50 ppm (235 mg/m ³)	10,000 ppm	Straw-colored liquid with a weak, coconut oil odor	MW: 114 BP: 311 to 356°F Sol: Slight F.P.: 149°F	VP: <1 mm MP: <6°F UEL: ? LEL: ?	Strong oxidizers Char; CH ₂ Cl ₂ ; Set 5
o-Methylcyclohexanone <chem>C7H12O</chem> 563-60-8 GW1750000 2297 26	2-Methylcyclohexanone	100 ppm (460 mg/m ³) (ACGIH) 50 ppm (230 mg/m ³)	2500 ppm	Colorless liquid with a weak peppermint odor	MW: 112 BP: 329°F Sol: Insoluble F.P.: 118°F	VP: ≈1 mm MP: 6.8°F UEL: ? LEL: ?	Strong oxidizers Ads; Acetone; GC; Set 2

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	NIOSH 1000 ppm: SA*/SCBA* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Head, less, CNS depres, poor equi, irrit eyes, dermat, card arrhy	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, CNS, CVS, eyes
Methyl chloromethyl ether—See Chloromethyl methyl ether					
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	ACGIH 4000 ppm: SA/SCBA 10,000 ppm: SA:CF/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head; drowsy; skin, nose, throat irrit	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 500 ppm: SA*/SCBA* 1250 ppm: SA:CF* 2500 ppm: SCBAF:SAF 10,000 SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head; irrit eyes, resp sys; dermat	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes; in animals: CNS, liver, kidneys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 500 ppm: SA*/SCBA* 1250 ppm: SA:CF* 2500 ppm: SAF:SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	None known in humans; in animals: drow; irrit eyes, nose, throat, skin	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	In animals: pulmonary, lungs, liver, kidneys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Methods (See Tables 1a and 1b)
Methylene bisphenyl isocyanate $C_{12}H_{10}O_2N_2$ 101-68-8 NQ9350000 2489 53	MDI; 4,4-Diphenylmethane diisocyanate; Methylene bis(4-phenyl isocyanate); 4,4-Diisocyanodiphenylmethane	0.02 ppm cell (0.2 mg/m ³) (NIOSH) 50 µg/m ³ 10-hr TWA (0.005 ppm) 200 µg/m ³ 10-min cell (0.02 ppm)	10 ppm	White to light-yellow flakes; odorless	MW: 250 BP: 342°F Sol: 0.2% FLP(oc): 398°F	VP: 0.05 mm MP: 99°F UEL: N.A. LEL: N.A.	Strong alkalis, acids, alcohol Imp (reagent); acetic anhydride; HPLC; III
Methylene chloride CH_2Cl_2 75-09-2 PA8050000 1593 74	Dichloromethane, Methylene dichloride	500 ppm 1000 ppm cell 2000 ppm 5 min/2-hr peak (NIOSH) Lowest feasible limit See Appendix A (ACGIH) 100 ppm	Ce	Colorless liquid with a chloroform-like odor	MW: 85 BP: 104°F Sol: 1.3% FLP: ? IP: 11.35 eV	VP: 350 mm MP: -142°F UEL: 19°F LEL: 12%	Strong oxidizers and caustics; chemically active metals, such as aluminum or magnesium powders; sodium, potassium Char(2); CS ₂ ; GC; III
Methyl formate $HCOOCH_3$ 107-31-3 LQ8925000 1243 26	Methyl methanoate, Formic acid, Methyl ester	100 ppm (250 mg/m ³)	5000 ppm	Colorless liquid with a pleasant odor	MW: 80 BP: 89°F Sol: 30% FLP: -2°F IP: 10.81 eV	VP: 476 mm MP: -148°F UEL: 23% LEL: 5%	Strong oxidizers Ads; Methyl/acetate; GC; Set 6
5-Methyl-3-heptanone $C_8H_{16}O$ 541-85-5 MJ7350000 2271 26	Ethyl sec-amyl ketone, Ethyl amyl ketone, Amyl ethyl ketone	25 ppm (130 mg/m ³)	3000 ppm	Colorless liquid with a mild, fruity odor	MW: 128 BP: 318°F Sol: 0.28% FLP: 110°F	VP: 2 mm MP: -70°F UEL: ? LEL: ?	Oxidizers Char; CH ₃ OH/CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	NIOSH 0.2 ppm: SA*/SCBA* 0.5 ppm: SA:CF* 1 ppm: SCBAF/SAF 10 ppm: SCBAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, pulm secretions; chest pain, dysp, asthma	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Fat, weak, sleep, li-head; limbs numb, tingle; nau; irrit eyes, skin; vertigo; worsen angina; [carc]	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, CVS, eyes, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: SA*/SCBA* 2500 ppm: SA:CF* 5000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Eye, nose irrit; chest oppression, dysp; via dist; CNS depres	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, CNS
Clothing: Any poss Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 250 ppm: SA*/SCBA* 625 ppm: SA:CF*/PAPROV* 1000 ppm: CCRFOV 1250 ppm: GMFOV/SCBAF/SAF 3000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; narco, coma; dem	Eye: Irr immed Skin: Water flush Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methyl iodide CH ₃ I 74-88-4 PA9450000 2644 55	Iodomethane	5 ppm (28 mg/m ³) (NIOSH) Lowest feasible limit See Appendix A (ACGIH) 2 ppm, A2	Ca	Colorless liquid which turns yellow, red, or brown on exposure to light and moisture	MW: 142 BP: 108°F Sol: 2% Not combustible IP: 9.54 eV	VP: 375 mm MP: -87°F	Strong oxidizers Char; toluene; GC; H
Methyl isobutyl carbinol C ₄ H ₁₀ O 108-11-2 SA7350000 2053 26	Methyl amyl alcohol, 4-Methyl-2-pentanol, MIBC	25 ppm (100 mg/m ³)	2000 ppm	Colorless liquid with a mild odor	MW: 102 BP: 269°F Sol: 1.5% F.P.: 106°F	VP: 3.8 mm MP: -130°F UEL: 5.5% LEL: 1%	Strong oxidizers Char; 2-Propanol in CS; GC; E
Methyl isocyanate CH ₃ NCO 624-83-9 NQ9450000 2480 30	None	0.02 ppm (0.05 mg/m ³)	20 ppm	Colorless liquid with a sharp odor; causes tears	MW: 57 BP: 102°F Sol: 6.7% F.L.P.(oc): < 0°F	VP: 348 mm MP: -112°F UEL: 26% LEL: 5.3%	Water, rapid reaction in presence of acid, alkali, amine; iron, tin, copper, their salts, other catalysts Imp (reagent): acetic anhydride; HPLC; III
Methyl mercaptan CH ₃ SH 74-83-1 PB4375000 1064 13	Methanethiol	10 ppm 15-min cell (20 mg/m ³) (NIOSH) 0.5 ppm cell 15-min cell (ACGIH) 0.5 ppm	400 ppm	Colorless gas with a disagreeable odor like garlic; can be liquid at < 43°F	MW: 48 BP: 43°F Sol: 2.4% F.L.P.(oc): 0°F IP: 9.44 eV	VP: > 1 atm MP: -186°F UEL: 21.8% LEL: 3.9%	Strong oxidizers, bleaches —

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Immed contam non-imperv	NIOSH E: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Nau, vomit, vertigo, ataxia, slur speech, drow, dem, eye irrit, blister skin, [carc]	Eye: Skin: Breath: Swallow:	Irr Immed Soap flush immed Art resp Medical attention Immed	CNS, skin, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 625 ppm: SA:CF* 1250 ppm: SCBAF/SAF 2000 ppm: SAF-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Eye irrit, head, drowsy, dem	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 0.2 ppm: SA*/SCBA* 0.5 ppm: SA:CF* 1 ppm: SCBAF/SAF 20 ppm: SAF-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, secretions, chest pain, dysp; eath; eye, skin injury	Eye: Skin: Breath: Swallow:	Irr Immed Water flush immed Art resp Medical attention immed	Resp sys, eyes, skin
Clothing: Prevent freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	NIOSH 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 Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Con	Narco, cyan, convuls, pulm irrit, resp paralysis, head, nau	Eye: Skin: Breath:	Irr Immed Water flush immed Art resp	Resp sys, CNS

Methyl mercaptan

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Methyl methacrylate CH ₂ C(CH ₃)COOCH ₃ 80-62-6 OZ5075000 1247 27	Methacrylic acid, methyl ester	100 ppm (410 mg/m ³)	4000 ppm	Colorless liquid with an acrid, fruity odor	MW: 100 BP: 212°F Sol: 1.5% Fl.P(oc): 50°F	VP: 35 mm MP: -54°F UEL: 8.2% LEL: 1.7%	Nitrates, oxidizers, peroxides, polymerizers, strong alkalies, moisture Char, CS ₂ , GC, D
alpha-Methyl styrene C ₉ H ₈ C(CH ₃)CH ₂ 96-83-9 WL5250000	1-Methyl-1-phenyl-ethylene, AMS	100 ppm cell (480 mg/m ³) (ACGIH) 50 ppm (240 mg/m ³)	5000 ppm	Colorless liquid with a characteristic odor	MW: 118 BP: 329°F Sol: insoluble Fl.P: 129°F IP: 8.35 eV	VP: 1.9 mm MP: -9°F UEL: 6.1% LEL: 1.9%	Oxidizers, peroxides, halogens, catalysts for vinyl or ionic polymers; aluminum, iron chloride Char, CS ₂ , GC, III
Mica (less than 1% quartz) 12001-26-2 VV8780000	Varies depending upon specific hydrous silicate	20 mppcf (ACGIH) 3 mg/m ³ (resp dust)	N.A.	Colorless, odorless flakes or sheets with < 1% quartz	MW: 797 BP: N.A. Sol: Insoluble Not combustible	VP: 90 mm MP: N.A.	None —
Molybdenum, soluble compounds (as Mo) Mo	Synonyms vary depending upon specific compound	5 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Alkali metals; sodium, potassium, molten magnesium	Filter; water; AA; M

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV*/CCRFOV 2500 ppm: SA:CF* 4000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; derm; narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, upper resp sys, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/CCRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; drow; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush promptly Art resp Medical attention immed	Eyes, resp sys, skin
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 100 mppcf: DM 200 mppcf: DXSQ/SA/SCBA 500 mppcf: PAPRDM*/SA:CF 1000 mppcf: HIEF/PAPRTHIE/SCBAF/ SAF/SAT:CF 10,000 mppcf: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Pneumoconiosis by X-ray, cough, dysp, weak, weight loss	Eye: Breath:	Irr immed Fresh air	Lungs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 50 mg/m ³ : DXSQ*/SA*/SCBA* 125 mg/m ³ : PAPRDM*/SA:CF* 250 mg/m ³ : HIEF/PAPRTHIE*/ SAT:CF*/SCBAF/SAF 5000 mg/m ³ : SA:PD,PP* 7500 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: loss of appetite, inco; irrit eyes, nose, throat; dysp, anemia; colic; gout	Eye: Skin: Breath: Swallow:	Irr immed Water flush Art resp Medical attention immed	Resp sys; in animals: kidneys, blood

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Molybdenum, insoluble compounds (as Mo) Mo 7439-96-7 QA4680000	Synonyms vary depending upon specific compound	15 mg/m ³ (ACGIH) 10 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties depending upon specific compound	Strong oxidizers	Filter; acid; AA; O
Monomethyl aniline C ₆ H ₅ NHCH ₃ 100-61-8 BY4550000 2294 57	N-Methyl aniline, MA, Methyl aniline	2 ppm (9 mg/m ³) (ACGIH) 0.5 ppm (2 mg/m ³)	100 ppm	Yellow to light-brown liquid with a weak, ammonia-like odor	MW: 107 BP: 384 °F Sol: Moderate Fl.P: 175 °F IP: 7.34 eV	VP: < 1 mm MP: -112 °F UEL: ? LEL: ?	Strong acids, strong oxidizers Bub (H ₂ SO ₄); NaOH; GC; K
Monomethyl hydrazine CH ₃ NHNH ₂ 80-34-4 MV5600000 1244 28	Methyl hydrazine	0.2 ppm cell (0.35 mg/m ³) (NIOSH) 0.08 mg/m ³ 120-min cell See Appendix A	Ca	Fuming, colorless liquid with an ammonia-like odor	MW: 46 BP: 190 °F Sol: Soluble Fl.P: 17 °F IP: 7.67 eV	VP: 36 mm MP: -62 °F UEL: 98% LEL: 2.5%	Oxides of iron, copper, manganese, lead, copper alloys; porous metals, earth, asbestos, wood, cloth; oxidants, hydrogen peroxide, nitric acid Bub (HCl) Phospho- molybdic acid; color; K
Morpholine C ₄ H ₉ ON 110-91-8 QD6475000 2054 29	Tetrahydro-1,4-oxazine; Diethylenimide oxide	20 ppm (70 mg/m ³)	8000 ppm	Colorless liquid with a weak, ammonia-like odor	MW: 87 BP: 263 °F Sol: Miscible Fl.P: 95 °F	VP: 7 mm MP: 23 °F UEL: 11% LEL: 1.8%	Strong acids, strong oxidizers SiO ₂ ; H ₂ SO ₄ ; GC; K

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 50 mg/m ³ : DM ⁺ 100 mg/m ³ : DMXSO ⁺ /SA/SCBA 250 mg/m ³ : PAPRDM ⁺ /SA:CF/ 500 mg/m ³ : HIEF/PAPRTHIE/ SAT:CF/SCBAF/SAF 7500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing	In animals: irrit eyes, nose, throat; weight loss	Breath: Art resp Swallow: Medical attention immed	None known
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv	ACGIH 5 ppm: SA/SCBA 12.5 ppm: SA:CF 25 ppm: SCBAF/SAF/SAT:CF 100 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Weak, dizz; head; dysp, cyan; methemoglobin- emia; pulm edema; liver, kidney damage	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, liver, kidney, blood
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Irrit eyes, vomit, diarr, resp irrit, tremors, ataxia, anoxia, cyan, convuls, [carc]	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	CNS, resp sys, liver, blood, CVS, eyes
Clothing: >25% AP/≤ 25% RP Goggles: Any poss Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: >15% eyewash/ >25% drench	OSHA 500 ppm: SA:CF+/PAPROV- 1000 ppm: SCBAF/SAF/CCRFOV 8000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Vis dist; nose irrit; cough; resp irrit; eye, skin irrit	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Naphtha (coal tar) 65996-79-4 GF8635000	Naphtha, Crude solvent coal tar naphtha, High solvent naphtha	100 ppm (400 mg/m ³)	10,000 ppm	Reddish-brown mobile liquid with an aromatic odor	MW: 2110 BP: 230 to 374 °F Sol: Insoluble Fl.P: 100 to 109 °F	VP: < 5 mm MP: ? UEL: ? LEL: ?	Strong oxidizers Char, CS, GC, G
2553 27							
Naphthalene C ₁₀ H ₈ 91-20-3 QJ0525000	White tar, Naphthalin	10 ppm (50 mg/m ³)	500 ppm	Colorless to brown solid with an odor of mothballs	MW: 128 BP: 424 °F Sol: 0.003% Fl.P: 174 °F IP: 8.14 eV	VP: 0.05 mm MP: 165 to 176 °F UEL: 5.9% LEL: 0.9%	Strong oxidizers Char, CS, GC, III
1334 32							
alpha-Naphthylamine C ₁₀ H ₉ N 134-32-7 QM1400000	1-Naphthylamine, 1-Amino-naphthalene	See Appendix C (NIOSH)	Ca	Colorless crystals with an unpleasant odor, which darken in air to a purplish-reddish color	MW: 143 BP: 572 °F Sol: 0.4% Fl.P: 315 °F	VP: 1 mm at 104 °C MP: 122 °F UEL: ? LEL: ?	Not available NIOSH 78-175
2077 55							
beta-Naphthylamine C ₁₀ H ₉ N 91-59-8 QM2100000	2-Naphthylamine; 2-Amino-naphthalene	See Appendix C (NIOSH) (ACGIH) A1b	Ca	Odorless, white to reddish, leaflet-shaped crystals which darken in air to reddish-purple color	MW: 143 BP: 563 °F Sol: Insoluble Fl.P: Combustible solid	VP: 1 mm at 108 °C MP: 230 °F UEL: ? LEL: ?	Not available NIOSH 78-175
1650 55							

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 1000 ppm: PAPROV/CCRFOV 2500 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF 10,000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, droway; irrit eyes, nose, skin; derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work if it may be contam Remove: Promptly contam non-imperv	OSHA 100 ppm: CCROVDM*/SA*/SCBA* 250 ppm: SA:CF*/PAPROVDM* 500 ppm: CCRFOVHIE/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Eye irrit; head; conf, excitement; mal, nau, vomit, abdom pain; irrit bladder; profuse sweat; jaun; hema; hemog; renal shut; derm	Eye: Irr immed Skin: Molten: flush immed sol/liq: soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, blood, liver, kidneys, skin, RBC, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBA	Inh Abs Ing Con	Derm; hemorrhagic cystitis; dysp, ataxia, methemoglobinemia; hema; dys, [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Bladder, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBA	Inh Abs Ing Con	Derm, hemorrhagic cystitis; dysp, ataxia, methemoglobinemia, hema, dys, [carc]	Eye: Irr immed (15 min) Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Bladder, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Nickel, metal and soluble compounds (as Ni) Ni 7440-02-0 QR5950000 1378 32	Synonyms vary depending upon specific compound	1 mg/m ³ (NIOSH) 15 µg Ni/m ³ 10-hr TWA See Appendix A (ACGIH) 1 mg/m ³ (metal) 0.1 mg/m ³ (soluble)	Ca	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong acids, sulfur, Ni(NO ₃) ₂ ; wood, other combustibles	Filter; acid; AA; N
Nickel carbonyl Ni(CO) ₄ 13463-39-3 QR6300000 1258 28	None	0.001 ppm (0.007 mg/m ³) (NIOSH) 1 ppb TWA (lowest detectable limit) See Appendix A	Ca	Colorless liquid with a musty odor	MW: 171 BP: 109°F Sol: 0.018% F.L.P.: < -4°F IP: 8.28 eV	VP: 321 mm MP: -13°F UEL: ? LEL: 2%	Nitric acid, chlorine, other oxidizers, combustible vapors NIOSH 82-100
Nicotine C ₁₀ H ₁₄ N ₂ 54-11-5 QS5250000 1854 55	3-(1-Methyl-2-pyrrolidyl) pyridine	0.5 mg/m ³	35 mg/m ³	Pale yellow to dark brown liquid with a slight, fishy odor when warm	MW: 162 BP: 511°F Sol: Miscible < 140°F F.L.P.: 203°F	VP: 0.0425 mm MP: -110°F UEL: 4% LEL: 0.7%	Strong oxidizers, strong acids Resin; ethyl acetate; GC; T
Nitric acid HNO ₃ 7897-37-2 QU5775000 2032 44	Aqua fortis, White fuming nitric acid (WFNA), Red fuming nitric acid (RFNA), Hydrogen nitrate	2 ppm (5 mg/m ³) (NIOSH) 2 ppm (5 mg/m ³) 10-hr TWA	100 ppm	Colorless, yellow, or red fuming liquid with an acrid, suffocating odor	MW: 63 BP: 183 to 251°F Sol: Miscible Not combustible IP: 11.03 eV	VP: 2.6 to 103 mm MP: -42 to -61°F	Combustible organics, oxidizable matter; wood, turpentine, metal powder, hydrogen sulfide, etc.; strong bases SiO ₂ ; NaHCO ₃ ; IC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: Alter work it may be contam Remove: Promptly contam non-imperv	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Sens derm; allergic asth; nasal cavities; pneumonitis; [carc]	Skin: Breath: Swallow: Water flush immed Art resp Medical attention immed	Nasal cavities, lungs, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon wet Change: N.A. Remove: Any wat immed (flamm)	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Head; verti, nau, epigastric pain, substernal pain; cough, hyperpnea; cyan; leukocytosis; pneumitis, paranasal sinus; delirium; convul; [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	Lungs, paranasal sinus, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 5 mg/m ³ : SA/SCBA 12.5 mg/m ³ : SA:CF* 25 mg/m ³ : SCBAF/SAF/SAT:CF* 35 mg/m ³ : SA:PD,PP* G: SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, salv, abdom pain, vomil, diarr, head, dizz, disturb hearing, vision, confusion, weak, inco, paroxysmal/atrial fibril, convul, dyps	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	CNS, CVS, lungs, GI tract
Clothing: AP pH< 2.5/RP pH >2.5 Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: pH <2.5 eyewash, quick drench	NIOSH 125 mg/m ³ : SA:CF* 250 mg/m ³ : SCBAF/SAF/GMFS ¹ /CCRSF ¹ (SCBAF:PD,PP/ SAF:PD,PP-ASCBA Escape: GMFS ¹ /SCBAE	Inh Ing Con	Irrit eyes, muc memb, skin; delayed pulm edema; pneumitis; bron; dental erosion	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	Eyes, resp sys, skin, teeth

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Nitric oxide NO 10102-43-9 QX0525000 1660 20	Nitrogen monoxide	25 ppm (30 mg/m ³) (NIOSH) 25 ppm 10-hr TWA (30 mg/m ³)	100 ppm	Colorless gas with a sharp, sweet odor, brown at high concentrations in air	MW: 30 BP: -241°F Sol: Reacts Not combustible IP: 9.27 eV	VP: 26,000 mm MP: -263°F	Combustible matter, chlorinated hydrocarbons, ammonia, carbon disulfide, metals, fluorine, ozone	Ads; reagent color; color; Set 5
p-Nitroaniline C ₆ H ₅ N ₂ O ₂ 100-01-6 BY7000000 1661 55	Azoic diazo component 37, para-Aminonitrobenzene, Fast red GG base, 4-Nitroaniline, PNA	1 ppm (6 mg/m ³) (ACGIH) 3 mg/m ³	300 mg/m ³	Yellow crystals with a pungent, faint ammonia-like odor	MW: 138 BP: 630°F Sol: 0.08% F.P.: 390°F IP: 8.65 eV	VP: <<1 mm MP: 293°F UEL: ? LEL: ?	Strong oxidizers and reducers	NIOSH 79-141
Nitrobenzene C ₆ H ₅ NO ₂ 98-95-3 DA6475000 1662 55	Nitrobenzol, Oil of mirbane	1 ppm (5 mg/m ³)	200 ppm	Pale yellow to dark brown, oily liquid with an odor like black paste shoe polish	MW: 123 BP: 412°F Sol: 0.2% F.P.: 190°F IP: 9.92 eV	VP: <<1 mm MP: 41°F UEL: ? LEL: 1.8%	Concentrated nitric acid, nitrogen tetroxide, caustic, chemically active metals like tin or zinc	SiO ₂ ; CH ₃ OH; GC; P
4-Nitrobiphenyl C ₁₂ H ₉ NO ₂ 92-93-3 DV5600000	p-Nitrobiphenyl, p-Nitrodiphenyl, 4-Nitrodiphenyl, 4-Phenyl-nitrobenzene, p-Phenyl-nitrobenzene, PNB	See Appendix C (NIOSH) (ACGIH) A1b	Ca	White to yellow needle-like crystals	MW: 199 BP: 644°F Sol: insoluble F.P.: N.A.	VP: ? MP: 237°F UEL: N.A. LEL: N.A.	Strong reducers	NIOSH 77-157A

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 100 ppm: SA/CF* PAPRS*/SA*/SCBA/ CCRSF*/GMFS* Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS*/SCBAE	Inh Con	Irrit eyes, nose, throat; drows; unconscious	Breath: Art resp	Resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam/daily Change: After work it may be contam Remove: Immed contam non-imperv Provide: Quick drench	ACGIH 30 mg/m ³ : SA*/SCBA* 75 mg/m ³ : SA/CF* 150 mg/m ³ : SCBAF/SAF 300 mg/m ³ : SA/PD,PP* Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOVDMFu/SCBAE	Inh Abs Ing Con	Cyan, ataxia, tachycard, tachypnea, dysp, irrtty, vomit, diarr, convuls, resp arrest, anemia, methemoglobinemia	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Blood, heart, lungs, liver
Clothing: Any poss Goggles: Reason prob Wash: N.A. Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	OSHA 10 ppm: CCROV*/SA*/ SCBA* 25 ppm: SA/CF*/PAPROV* 50 ppm: CCRFOV/GMFOV/SCBAF/SAF 200 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia, irrit eyes, derm, anemia, dizz, nau, vomit, dysp	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, liver, kidneys, CVS, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH 2: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Head, lethargy, dizz, dysp, ataxia, weak, methemoglobinemia, unnary burning, acute hemorrhage cystitis, [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Bladder, blood

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
p-Nitrochlorobenzene $C_6H_4ClNO_2$ 100-00-5 CZ1050000 1578 55	PNCB, PCNB, 4-Chloronitrobenzene, p-Chloronitrobenzene, 1-Chloro-4-nitrobenzene	1 mg/m ³	1000 ppm	Yellow solid with a sweet odor	MW: 158 BP: 468 °F Sol: 0.003% Fl.P: 261 °F IP: 9.99 eV	VP: <<1 mm MP: 181 °F UEL: ? LEL: ?	Strong oxidizers SiO ₂ ; CH ₃ OH; GC; P
Nitroethane $C_2H_5NO_2$ 79-24-3 K15600000 2842 28	None	100 ppm (310 mg/m ³)	1000 ppm	Colorless liquid with a mild, fruity odor	MW: 75 BP: 237 °F Sol: 4.5% Fl.P: 82 °F IP: 10.88 eV	VP: 15.6 mm MP: -130 °F UEL: ? LEL: 3.4%	Amines, strong acids, alkalies, and oxidizers; hydrocarbons, other combustibles; metal oxides
Nitrogen dioxide NO_2 and N_2O_4 10102-44-0 QW9800000 1067 20	Nitrogen tetroxide, NTO, Dinitrogen tetroxide, Nitrogen peroxide	5 ppm cell (9 mg/m ³) (NIOSH) 1 ppm 15-min cell (1.8 mg/m ³) (ACGIH) 3 ppm	50 ppm	Dark brown, fuming liquid or gas with a pungent, acrid odor	MW: 46/92 BP: 70 °F Sol: Reacts Not combustible IP: 9.75 eV	VP: 720 mm MP: 12 °F	Combustible matter, chlorinated hydrocarbons, ammonia, carbon disulfide Ads; Sulfanilimide & NEDA color, III
Nitrogen trifluoride NF_3 7783-54-2 QX1925000 2451 15	None	10 ppm (29 mg/m ³) (ACGIH) 10 ppm (30 mg/m ³)	2000 ppm	Colorless gas with a moldy odor	MW: 71 BP: -200 °F Sol: Insoluble Not combustible IP: 13 eV	VP: >1 atm MP: -340 °F	Water, oil, grease; oxidizable materials; ammonia, carbon monoxide, methane, hydrogen, hydrogen sulfide, active metals; oxides

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Reason prob Wash: Pro contam/imm'd wet/daily Change: After work it may be contam Remove: Pro contam/imm'd wet non-imperv Provide: Quick drench	OSHA 10 mg/m ³ : DMXSO/SA/SCBA 25 mg/m ³ : PAPDM/SA:CF 50 mg/m ³ : HiEF/PAPRTHiE/ SAT:CF/SCBAF/SAF 1000 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Anoxia, unpleasant taste; mild anemia; dizz, weak; nau, vomit; dysp	Eye: Irr imm'd Skin: Soap wash imm'd Breath: Art resp Swallow: Medical attention imm'd	Blood, liver, kidneys, CVS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet imm'd (flamm)	OSHA 1000 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con Ing	Derm	Eye: Irr imm'd Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention imm'd	Skin
Clothing: Any posa Goggles: Any posa Wash: Imm'd upon contam Change: N.A. Remove: Imm'd contam non-imperv Provide: Eyewash, quick drench	NIOSH 25 ppm: SA:CF* 50 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Cough, mucoid frothy sputum, dysp, chest pain, pulm edema, cyan, tachypnea, tachycardia, eye irrit	Eye: Irr imm'd Skin: Water flush imm'd Breath: Art resp Swallow: Medical attention imm'd	Resp sys, CVS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 100 ppm: SA/SCBA/CCRS 250 ppm: SA:CF/PAPRS 500 ppm: SCBAF/SAF/CCRSF/ GMFS/SAT:CF/PAPRTS* 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	None known in humans; in animals: methemoglobinemia	Breath: Art resp	None known in humans; in animals: blood

Nitrogen trifluoride

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Nitromethane CH ₃ NO ₂ 75-52-5 PA9600000 1261 26	None	100 ppm (250 mg/m ³)	1000 ppm	Colorless liquid with a mild, fruity odor	MW: 61 BP: 214°F Sol: 9.5% F.P.: 95°F IP: 11.06 eV	VP: 27.8 mm MP: -20°F UEL: ? LEL: 7.3%	Amines, strong acids, alkalis, and oxidizers; hydrocarbons, other combustibles; metallic oxides NIOSH 78-175
1-Nitropropane CH ₃ CH ₂ CH ₂ NO ₂ 108-03-2 TZ5075000 2608 26	None	25 ppm (90 mg/m ³)	2300 ppm	Colorless liquid with a mild, fruity odor	MW: 89 BP: 268°F Sol: 1.4% F.P.: 96°F IP: 10.81 eV	VP: 7.5 mm MP: -162°F UEL: ? LEL: 2.2%	Amines, strong acids, alkalis; strong oxidizers; hydrocarbons, other combustibles, metal oxides --
2-Nitropropane CH ₃ CH(NO ₂)CH ₃ 79-46-9 TZ5250000 2608 26	sec-Nitropropane	25 ppm (90 mg/m ³) (NIOSH) Lowest feasible limit See Appendix A (ACGIH) 10 ppm, A2	Ca	Colorless liquid with a mild, fruity odor	MW: 89 BP: 248°F Sol: 1.7% F.P.: 82°F IP: 10.71 eV	VP: 12.9 mm MP: -135°F UEL: ? LEL: 2.6%	Amines, strong acids, alkalis, and oxidizers, metal oxides, combustible materials --
N-Nitrosodimethylamine C ₂ H ₇ N ₂ O 62-75-9 IQ0525000	N-Nitrosodimethylamine; NDMA, Dimethylnitrosamine; DMNA; N,N-Dimethylnitrosamine; DMN; N-Methyl-N-Nitrosomethanamine	See Appendix C (NIOSH) (ACGIH) A2	Ca	Yellow liquid of low viscosity, no appreciable odor	MW: 74 BP: 306°F Sol: Soluble F.P.: ?	VP: ? MP: ? UEL: ? LEL: ?	Strong oxidizing agents NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: SA:CF*/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con Ing	Derm	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention immed	Skin
Clothing: N.A. Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet Immed (flamm)	OSHA 250 ppm: SA*/SCBA* 625 ppm: SA:CF* 1250 ppm: SCBAF/SAF 2300 ppm: SAF:PD,PP Q: 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 promptly Art resp Medical attention immed	Eyes, CNS
Clothing: N.A. Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	NIOSH E: 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 promptly Art resp Medical attention immed	Resp sys, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contamination Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: H2E/SCBAE	Inh Abs Ing Con	Nau, vomit, diarr, abdom cramps; head; fvr; enl liv; jaun; reduced function of liv, kid, and lungs; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	Liver, kidney, lungs

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Nitrotoluene <chem>NO2C6H4CH3</chem> 0-86-72-2 M-99-08-1 P-99-99-0 XT3150000 XT2975000 XT3325000 1684 55	Ortho/nitrotoluene, o-Nitrotoluol, Metanitrotoluene, m-Nitrotoluol, Paranitrotoluene, p-Nitrotoluol	5 ppm (30 mg/m ³) (ACGIH) 2 ppm (11 mg/m ³)	200 ppm	Ortho/meta: Yellow liquid or solid, weak, aromatic odor Para: Pale yellow solid; weak, aromatic color	MW: 137 BP: 432/450/460 °F Sol: 0.06/0.05/ 0.005 % Fl.P: 223/214/ 223 °F IP: 9.65/9.79 eV	VP: 0.15/0.15/ 0.12 mm MP: 25/61/ 126 °F UEL: ? LEL: 2.2/1.6/ 1.6%	Strong oxidizers, sulfuric acid	SiO ₂ ; CH ₂ OH; GC; O
Octachloro- naphthalene <chem>C10Cl8</chem> 2234-13-1 GK0250000	Halowax 1051	0.1 mg/m ³	200 mg/m ³	Pale yellow solid with an aromatic odor	MW: 404 BP: 2770 °F Sol: Insoluble Not combustible	VP: < 1 mm MP: 365 °F	Strong oxidizers	Filter; hexane; GC; G
Octane <chem>C8H18</chem> 111-65-9 RG8400000 1262 27	Normal octane	500 ppm (2350 mg/m ³) (NIOSH) 75 ppm 10-hr TWA 385 ppm 15-min cell (ACGIH) 300 ppm	5000 ppm	Colorless liquid with a gasoline- like odor	MW: 114 BP: 258 °F Sol: 90.04 % Fl.P: 56 °F IP: 9.9 eV	VP: 11 mm MP: -70 °F UEL: 6.5 % LEL: 1 %	Strong oxidizers	Char; CS ₂ ; GC; III
Oil mist (mineral) 8012-95-1 PY8030000 1270 27	Mist of white mineral oil, cutting oil, heat- treating oil, hydraulic oil, cable oil, lubricating oil	5 mg/m ³	N.A.	Mist with an odor like burned lube oil	MW: N.A. BP: 680 °F Sol: Insoluble Fl.P: 275 °F	VP: Very low MP: Very low UEL: N.A. LEL: N.A.	None hazardous	Filter; chloroform; fluoro-spectro; S

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)		Health Hazards			
				Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat Goggles: prolong Reason: prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv		ACGIH 20 ppm: SA*SCBA* 50 ppm: SA:CF* 100 ppm: SCBAFSAFSAFAT:CF* 200 ppm: SA:PD,PP* Q: SCBAF:PD,PP SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Anoxia, cyan, head, weak, dizz, ataxia, dysp, tachy- cardia, nau, vomit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	Blood, CNS, CVS, skin, GI tract
Clothing: AP molten/PP sol-liq Goggles: AP molten/Pass sol-liq Wash: Prompt upon contamination Change: After work it may be contam Remove: Non-imperv contam; molten imm/sol-liq pro		OSHA 1 mg/m ³ : SA:SCBA 2.5 mg/m ³ : SA:CF 5 mg/m ³ : SCBAFSAFSAFAT:CF 100 mg/m ³ : SA:PD,PP 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP:SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Acneform dermat, liver damage, jaun	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Art resp Medical attention immed	Skin, liver
Clothing: Repeat Goggles: prolong Reason: prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)		NIOSH 750 ppm: SA*SCBA* 1875 ppm: SA:CF* 3750 ppm: SCBAF/SAF 5000 ppm: SA,PD,PP* Q: SCBAF:PD,PP SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose, drow; derm; chem pneumonitis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Skin, eyes, resp sys
Clothing: Repeat Goggles: prolong Reason: N.A. Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non- imperv		OSHA 50 mg/m ³ : SA:SCBA:HE 125 mg/m ³ : SA:CF:PAPR:HE 250 mg/m ³ : HIEF/PAPR:HE SAT:CF/SCBAF/SAF 2500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP:SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	None reported	Skin: Breath:	Soap wash Fresh Air	Resp sys, skin

OH mist (mineral)

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Osmium tetroxide OsO ₄ 20818-12-0 RN1140000 2471 55	Osmic acid	0.002 mg/m ³	1 mg/m ³	Colorless to pale yellow solid with an odor like chlorine; sharp and choking	MW: 254 BP: 266 °F Sublimes Sol: 7% Not combustible	VP: 7 mm MP: 108 °F Hydrochloric acid, easily oxidized organic materials	—
Oxalic acid HOOC-COOH·2H ₂ O 144-82-7 RO2450000 2449 54	Oxalic acid dihydrate, Ethane dioic acid	1 mg/m ³	500 mg/m ³	Colorless, odorless solid	MW: 126 BP: 300 to 320 °F Sublimes Sol: 10% F.I.P.: None	VP: <0.001 mm MP: 215 °F UEL: ? LEL: ?	Strong oxidizers, silver —
Oxygen difluoride OF ₂ 7783-41-7 RS2100000 2190 20	Difluorine monoxide, Fluorine monoxide	0.05 ppm (0.1 mg/m ³) (ACGIH) 0.05 ppm (cell) (0.1 mg/m ³)	0.5 ppm	Colorless gas with a foul odor	MW: 54 BP: -229 °F Sol: 0.02% Not combustible, but strong oxidizer IP: 13.13 eV	VP: >1 atm MP: -371 °F All combustible materials, chlorine, bromine, iodine, platinum, metal oxides, moist air	—
Ozone O ₃ 10028-15-6 RS8225000	None	0.1 ppm (0.2 mg/m ³)	10 ppm	Colorless gas with a very pungent, characteristic odor, associated with electrical sparks	MW: 48 BP: -170 °F Sol: 0.00003% F.I.P.: N.A. IP: 12.67 eV	VP: >1 atm MP: -313 °F UEL: N.A. LEL: N.A.	All oxidizable materials, both organic and inorganic Imp (K/NaOH): phosphoric sulfamic acid color, B

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash	OSHA 0.1 mg/m ³ : SAF/SCBAF/CCRSF/HIE/GMFSHIE 1 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Lac, via diat, con; head; cough; dysp; derm; skin burns; kidney damage	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin
Clothing: Repeat Prolong Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 25 mg/m ³ : PAPRDM ₉ /SA:CF ₉ 50 mg/m ³ : HIEF/SCBAF/SAF 500 mg/m ³ : SAF:PD,PP Q: 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, convul	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Immed	Resp sys, skin, kidneys, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 0.5 ppm: SCBA/SA Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS ⁹ /SCBAE	Inh Con	Intractable headache; resp sys irrit; pulm edema; eye, skin burns	Eye: Irr Immed Skin: Water flush Immed Breath: Medical attention immed	Lungs, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 1 ppm: SA/SCBA/CCRS ⁹ 2.5 ppm: SA:CF/PAPRS ⁹ 5 ppm: CCRSF ⁹ /GMFS ⁹ / SCBAF/SAF/SAT:CF 10 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS ⁹ /SCBAE	Inh	Irrit eyes, muc memb; pulm edema, chronic resp disease	Eye: Medical aid Breath: Fresh air, 100% O ₂	Eyes, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Paraquat compounds	Synonyms vary depending upon specific compound	0.5 mg/m ³ (ACGIH) 0.1 mg/m ³ (respirable sizes)	1.5 mg/m ³	Odorless, colorless solids	MW: 257 to 408 BP: Decomposes at 347 to 356°F Sol: Very soluble Not combustible	VP: 20 mm MP: ? Strong oxidizers	Filter; H ₂ O; HPLC; II
2588 53							
Parathion (C ₈ H ₁₀ O) ₂ PSOC ₂ H ₄ NO ₂ 56-38-2 TF4550000	o,o-Diethyl-o,p-nitrophenyl phosphorothioate; Ethyl parathion	0.1 mg/m ³ (NIOSH) 0.05 mg/m ³ 10-hr TWA	20 mg/m ³	Yellow to dark brown liquid with an odor like garlic	MW: 291 BP: 707°F Sol: 0.00002% Not combustible	VP: 0.0004 mm MP: 43°F pure 32°F tech Strong oxidizers	Filter; iso-octane; GC; III
2783 55							
Pentaborane B ₅ H ₉ 19824-22-7 RY8925000	Stable pentaborane, Pentaboron nonahydride	0.005 ppm (0.01 mg/m ³)	3 ppm	Colorless liquid with a strong pungent odor	MW: 83 BP: 137°F Sol: Reacts F.P.: 86°F IP: 10.5 eV	VP: 171 mm MP: -52°F UEL: ? LEL: 0.42% Oxidizers, halogens, halogenated compounds; impure material ignites spontaneously	—
1380 75							
Pentachloronaphthalene C ₁₀ H ₂ Cl ₅ 1321-64-8 QK0300000	Halowax 1013	0.5 mg/m ³	N.A.	Pale yellow solid with an aromatic odor	MW: 301 BP: 620 to 700°F Sol: Insoluble Not combustible	VP: <1 mm MP: 248°F Strong oxidizers	Filter & bub. iso-octane, GC; G

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: Reason prob Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	ACGIH 1 mg/m ³ : CCROVDMFu/SA/ SCBA* 1.5 mg/m ³ : CCROVDMFu/SA:CF* SCBAF/SAF/PAPROVDMFu* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, epia; derm; fingernail damage; irrit GI; heart, liver, kidney damage; acute pulm inflam	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	Eyes, resp sys, heart, liver, kidneys, GI tract	
Clothing: Repeat prolong Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH 0.5 mg/m ³ : CCROVDMFu/SA/SCBA 1.25 mg/m ³ : SA:CF/PAPROVDMFu 2.5 mg/m ³ : CCRFOVHIE/SAF/SCBAF/ PAPRHIEOV/SAT:CF 20 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Miosis, rhin; head; chest wheeze, lar spas; saliv; cyan; anor; nau; abdom cramp, diarr; sweat; musc fasc; weak; para; atax; convuls; low BP; card; derm	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	Resp sys, CNS, CVS, eyes, skin, blood cholinesterase	
Clothing: Reason prob Goggles: Any poss Wash: Immed upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 0.05 ppm: SA/SCBA 0.125 ppm: SA:CF 0.25 ppm: SCBAF/SAF/SAT:CF 3 ppm: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Dizz; head; drow, li-head; inco; tremor; tonic spas face, neck, abdom, limbs; convuls; irrit eyes, skin	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	CNS, eyes, skin	
Clothing: AP molten/RP sol-liq Goggles: AP molten/Reas sol-liq Wash: Promptly upon contam Change: After work it may be contam Remove: Non-imperv contam; molten imm/sol-liq pro	OSHA 5 mg/m ³ : SA/SCBA* 12.5 mg/m ³ : SA:CF* 25 mg/m ³ : SCBAF/SAF/SAT:CF* 500 mg/m ³ : SA:PD,PP* 1000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Head; ftg, verti; anor; punita, acneform skin eruptions; jaun, liver necrosis	Eye: Skin: Breath: Swallow: Irr immed Soap promptly/flush immed molten Art resp Medical attention immed	Skin, liver, CNS	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurements Method (See Tables 1 and 1b)
Pentachlorophenol C_6Cl_5OH 87-86-5 SM6300000 2020 53	PCP, Penta	0.5 mg/m ³	150 mg/m ³	Light-brown solid with a pungent odor when hot	MW: 286 BP: 592°F Sol: 0.002% Not combustible	VP: 0.0002 mm MP: 360 to 374°F	Strong oxidizers NIOSH 78-175
Pentane C_5H_{12} 109-66-0 R29450000 1265 27	Normal pentane	1000 ppm (2950 mg/m ³) (NIOSH) 120 ppm (350 mg/m ³) 10-hr TWA (ACGIH) 600 ppm	15,000 ppm	Colorless liquid with a gasoline-like odor	MW: 72 BP: 97°F Sol: 0.04% FLP: -57°F IP: 10.35 eV	VP: 426 mm MP: -200°F UEL: 7.8% LEL: 1.5%	Strong oxidizers Char; CS ₂ ; GC; III
2-Pentanone $CH_3COC_2H_5$ 107-87-9 SA7875000 1249 26	Methyl propyl ketone, Ethyl acetone, MPK	200 ppm (700 mg/m ³) (NIOSH) 530 mg/m ³ (150 ppm) 10-hr TWA	5000 ppm	Water-white liquid with a characteristic ketone odor	MW: 86 BP: 216°F Sol: 4.3% FLP: 45°F IP: 9.37 eV	VP: 27 mm MP: -108°F UEL: 8.2% LEL: 1.5%	Oxidizing agents Char; CS ₂ ; GC; III
Perchloromethyl mercaptan CCl_3SCl 594-42-3 PB0370000 1670 56	PMM, Trichloromethyl sulfur chloride	0.1 ppm (0.8 mg/m ³)	10 ppm	Pale yellow, oily liquid with a foul-smelling, strong, acrid odor	MW: 186 BP: 300°F Sol: Insoluble Not combustible	VP: 65 mm MP: ?	Alkalies, amines, hot iron, hot water —

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 5 mg/m ³ : CCROVDMFu*/SA*/SCBA* 12.5 mg/m ³ : SA:CF*/PAPROVDMFu* 25 mg/m ³ : CCRFOVHIE/SF/SCBAF 150 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; sneez, cough; weak, anor, low-wgt; sweat; head; dizz; nau, vomit; dysp, chest pain; derm	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	CVS, resp sys, eyes, liver, kidneys, skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 1200 ppm: SA/SCBA 3000 ppm: SA:CF 6000 ppm: SCBAF/SAF/SAT:CF 15,000 ppm: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Drow; Irrit eyes, nose; derm; chem pneumonia	Eye: Irr Immed Skin: Water wash promptly Breath: Art resp Swallow: Medical attention Immed	Skin, eyes, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 1000 ppm: CCROV*/PAPROV* 1500 ppm: SA*/SCBA* 3750 ppm: SA:CF* 5000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, muc memb; head; derm; narcoals, coma	Eye: Irr Immed Skin: Water flush Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non- imperv	OSHA 1.0 ppm: SA*/SCBA*/CCROV* 2.5 ppm: SA:CF*/PAPROV* 5 ppm: CCRFOV/GMFOV/SCBAF/SAF/ SAT:CF*/PAPRTOV* 10 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Lac, eye inflam; irrit nose, throat; cough; dysp; deep breath pain, coarse rales; vomit; pallor; tachycardia; acidoals; anuria	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	Eyes, resp sys, liver, kidneys, skin

Perchloromethyl mercaptan

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Perchloryl fluoride ClO_2F 7816-84-8 SD1925000 1855 15	Chlorine oxyfluoride	3 ppm (13.5 mg/m ³)	385 ppm	Colorless gas with a characteristic, sweet odor	MW: 103 BP: -52°F Sol: 0.08% Not combustible IP: 13.8 eV	Combustibles, strong bases, amines, finely divided metals; oxidizable materials	—
Petroleum distillates (naphtha) 8002-05-9 SE7449000 1268 27	Petroleum naphtha; Aliphatic petroleum naphtha; Petroleum ether (95 to 115°C); Naphtha, petroleum	500 ppm (2000 mg/m ³) (NIOSH) 350 mg/m ³ 10-hr TWA 1800 mg/m ³ 15-min cell	10,000 ppm	Colorless liquid with an odor like gasoline and kerosene	MW: #100 BP: 85 to 260°F Sol: 90.04% F.L.P.: -40 to -86°F	Strong oxidizers	Char; CS ₂ ; GC; III
Phenol $\text{C}_6\text{H}_5\text{OH}$ 108-95-2 SJ3325000 1671 55 2821 55	Carbolic acid, Monohydroxy benzene	5 ppm (19 mg/m ³) (NIOSH) 20 mg/m ³ 10-hr TWA (5.2 ppm) 80 mg/m ³ 15-min cell (15.6 ppm)	250 ppm	Colorless to pink solid or thick liquid with a characteristic, sweet, tarry odor	MW: 94 BP: 359°F Sol: 8.4% F.L.P.: 174°F IP: 8.5 eV	Strong oxidizers, calcium hypochlorite	Bub (NaOH); H ₂ SO ₄ ; GC; III
p-Phenylene diamine $\text{C}_6\text{H}_8\text{N}_2$ 108-50-3 SS8050000 1873 53	p-Diamino benzene; 1,4-Diaminobenzene	0.1 mg/m ³	25 mg/m ³	White to light purple or brown solid	MW: 108 BP: 512°F Sol: 4.7% F.L.P.: 312°F IP: 7.58 eV	Strong oxidizers	—

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
			Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Immed contam non-imperv	OSHA 30 ppm: SA/SCBA 75 ppm: SA/CF 150 ppm: SCBAF/SAF 385 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS*/SCBAE	Inh Con	Resp Irrit; skin burns; in animals: methemoglobinemia	Eye: Breath:	Irr Immed Art resp	Resp sys, skin, blood
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 850 ppm: SCBA/SA 2125 ppm: SA/CF* 4250 ppm: SCBAF/SAF/SAT:CF* 10,000 ppm: SA/PD,PP* Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Dizz, drow; head; nau; ir-rit eyes, nose, throat; dry cracked skin	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention immed	Skin, eyes, resp sys, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 50 ppm: CCROVDM/SA/SCBA 125 ppm: SA/CF/PAPROVDM/ 250 ppm: SCBAF/SAF/CCRFOVHIE/ GMFHIEOV/PAPRTOVHIE Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, anor, low-wgt; weak, musc ache, pain; dark urine; cyan; liver, kidney damage; skin burn; dermat; ochronosis; tremor, convuls; twitch	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash Immed Art resp Medical attention immed	Liver, kidneys, skin
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam/ daily Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 2.5 mg/m ³ : SA/CF* 5 mg/m ³ : SAF/SCBAF 25 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Irrit pharynx, larynx; bron asth; sens derm	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash promptly Art resp Medical attention immed	Resp sys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Phenyl ether (C ₆ H ₅) ₂ O 101-84-8 KN8970000	Diphenyl ether, Diphenyl oxide	1 ppm (7 mg/m ³)	N.A.	Colorless solid or liquid with a somewhat disagreeable odor	MW: 170 BP: 498°F Sol: 0.0021% Fl.P: 239°F IP: 12.90 eV	VP: <1 mm MP: 81°F UEL: 1.5% LEL: 0.8%	Strong oxidizers Char; CS ₂ ; GC; F
Phenyl ether-biphenyl mixture (C ₆ H ₅) ₂ O and C ₆ H ₄ C ₆ H ₅ 8004-13-5 DV1500000	Dowtherm A, Diphenyl oxide-diphenyl mixture	1 ppm (7 mg/m ³)	N.A.	Straw-colored liquid, which darkens on use, with an aromatic, somewhat disagreeable odor	MW: 166 BP: 495°F Sol: 0.0014% Fl.P(oc): 255°F	VP(77°F): 0.08 mm MP: 54°F UEL(500°F): 6.2% LEL: 0.5%	Strong oxidizers SiO ₂ ; C ₆ H ₆ ; GC; F
Phenyl glycidyl ether C ₆ H ₄ OCH ₂ CHOCH ₂ 122-60-1 TZ3675000	Glycidyl phenyl ether; Phenyl epoxypropyl ether; 1,2-Epoxy-3-phenoxy-propane; PGE	10 ppm (60 mg/m ³) (NIOSH) 1 ppm 15-min cell (5 mg/m ³) (ACGIH) 1 ppm	N.A.	Colorless liquid	MW: 150 BP: 473°F Sol: Very low Fl.P: 248°F	VP: 0.01 mm MP: 38°F UEL: ? LEL: ?	Strong oxidizers, amines, strong acids, strong bases Char; CS ₂ ; GC; F
Phenyldiazine C ₆ H ₄ NHNH ₂ 100-63-0 MV8925000 2572 53	Hydrazinobenzene	5 ppm (22 mg/m ³) (NIOSH) 0.14 ppm (0.8 mg/m ³) 120-min cell See Appendix A (ACGIH) 5 ppm, A2	Ca	Colorless to pale yellow solid or liquid with a weak, aromatic odor	MW: 108 BP: 469°F Sol: Slight Fl.P: 192°F IP: 7.66 eV	VP: < 0.1 mm MP: 68°F UEL: ? LEL: ?	Strong oxidizers, lead dioxide Bub(HCl); phosphomolybdic acid; color. L

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-contam	OSHA 25 ppm: SA:CF*/PAPROVDM* 50 ppm: CCRFOVHIE/GMFHIEOV/ SCBAF/SAF 100 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Con Ing	Nau; irrit eyes, nose, skin	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 25 ppm: SA:CF*/PAPROVDM* 50 ppm: CCRFOVHIE/GMFHIEOV/ SCBAF/SAF 100 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Con Ing	Nau; irrit eyes, nose, skin	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Any poss Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH 25 ppm: SA:CF* 50 ppm: SCBAF/SAF 500 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Skin irrit, sens; irrit eyes, upper resp; narcosis	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, eyes, CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/ daily Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH ≥: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Aba Ing Con	Skin sensitization, hemolytic anemia, dysp, cyan, jaun; kidney damage; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, resp sys, liver, kidneys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Phosdrin $C_7H_{11}O_4PO_3$ 7786-34-7 G05250000 2783 55	Mevinphos® 2-Carbomethoxy-1-methylvinyl dimethyl phosphate	0.1 mg/m ³	40 mg/m ³	Colorless or yellow liquid with a weak odor	MW: 224 BP: 617°F Sol: Miscible Fl.P(oc): 175°F	VP: 0.003 mm MP: -69°F UEL: ? LEL: ?	Strong oxidizers Ads; toluene; GC; III
Phosgene $COCl_2$ 75-44-5 SY5600000 1076 15	Carbonyl chloride, Carbon oxychloride, Chloroformyl chloride	0.1 ppm (0.4 mg/m ³) (NIOSH) 0.1 ppm 10-hr TWA 0.2 ppm 15-min cell	2 ppm	Colorless liquid or gas with a sweet odor like hay at low concentrations; sharp, pungent odor at high concentrations	MW: 99 BP: 47°F Sol: Reacts Not combustible IP: 11.7 eV	VP: N.A. MP: -198°F	Moisture NIOSH 77-157A
Phosphine PH_3 7803-51-2 SY7525000 2199 18	Hydrogen phosphide, Phosphorus hydride, Phosphorated hydrogen	0.3 ppm (0.4 mg/m ³)	200 ppm	Colorless gas with a characteristic, fishy odor	MW: 34 BP: -126°F Sol: 0.04% Fl.P: N.A. IP: 9.98 eV	VP: >1 atm MP: -209°F UEL: ? LEL: ?	Air, oxidizers, chlorine, acids, moisture, halogenated hydrocarbons NIOSH 79-141
Phosphoric acid H_3PO_4 7864-38-2 T86300000 1805 80	White phosphoric acid, Orthophosphoric acid, 85% Phosphoric acid, Metaphosphoric acid	1 mg/m ³	N.A.	Viscous, colorless, odorless liquid; solidifies at <70°F	MW: 98 BP: 500°F Sol: Miscible Not combustible	VP: 0.03 mm MP: 70°F	Strong caustics, most metals SiO ₂ , NaHCO ₃ , IC, III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 1 mg/m ³ : SA/SCBA 2.5 mg/m ³ : SA/CF 5 mg/m ³ : SAF/SCBAF/SAT/CF 40 mg/m ³ : SA/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHEOV/SCBAE	Inh Abs Ing Con	Miosis; rhin; head; chest, wheez; tar spas; saliv, cyan; anor; nau; abdom cramp; diarr; para; atax, convul; low BP; card; irrit skin, eyes	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CNS, CVS, skin, blood cholin- esterase
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Quick drench	NIOSH 1 ppm: SA/SCBA* 2 ppm: SCBAF/SAF Q: 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: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 3 ppm: SA/SCBA 7.5 ppm: SA/CF 15 ppm: SCBAF/SAF/GMFS 200 ppm: SA/PD,PP Q: 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: Art resp	Resp sys
Clothing: >1.6% AP/1.6% RP Goggles: Any poss Wash: Immed upon contam Change: After work it may be contam soi Remove: Immed contam non-imperv Provide: >1.6% eyewash, quick drench	OSHA 25 mg/m ³ : SA/CF* 50 mg/m ³ : SAF/SCBAF/HIEF 2000 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIE/SCBAE	Inh Ing Con	Irrit upper resp tract, eyes, skin; burns skin, eyes; derm	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Phosphorus (yellow) P. 7723-14-0 TH350000 1381 38	White phosphorus; WP; Phosphorus, elemental, white	0.1 mg/m ³	N.A.	White to yellow, soft, waxy solid with acrid fumes in air	MW: 124 BP: 535°F Sol: 0.0003% F.P.: Spontaneous in air >86°F	VP: 0.028 mm MP: 111°F UEL: N.A. LEL: N.A.	Air, all oxidizing agents, including elemental sulfur, strong caustics Tenax; Xylene; GC; Set 5
Phosphorus pentachloride PCl ₅ 10026-13-8 TB8125000 1806 39	None	1 mg/m ³	200 mg/m ³	Pale yellow solid with an odor like hydrochloric acid	MW: 208 BP: 333°F Sol: Reacts Not combustible	VP: <1 mm MP: 333°F	Water; magnesium oxide; chemically active metals; sodium, potassium; alkalies NIOSH 79-141
Phosphorus pentasulfide P ₂ S ₅ or P ₄ S ₁₀ 1314-80-3 TH4375000 1340 41	Phosphorus persulfide, Regular phosphorus pentasulfide, Reactive phosphorus pentasulfide, Distilled phosphorus pentasulfide, Undistilled phosphorus pentasulfide	1 mg/m ³	750 mg/m ³	Greenish-yellow solid with an odor of rotten eggs	MW: 222 or 445 BP: 955°F Sol: Reacts F.L.P.: ?	VP(572°F): 1 mm MP: 527°F MEC: ?	Water, alcohols, strong oxidizers —
Phosphorus trichloride PCl ₃ 7719-12-2 TH3675000 1809 39	Phosphorus chloride	0.5 ppm (3 mg/m ³) (ACGIH) 0.2 ppm (1.5 mg/m ³)	50 ppm	Colorless to yellow, fuming liquid with an odor like hydrochloric acid	MW: 137 BP: 168°F Sol: Reacts Not combustible IP: 9.91 eV	VP: 100 mm MP: -169°F	Water, alcohol, when in contact with combustible organics; chemically active metals; sodium, potassium, aluminum, strong nitric acid NIOSH 79-141

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any immed contam Provide: Eyewash, quick drench	OSHA 1 mg/m ³ : DMF 2.5 mg/m ³ : PAPRIIE*/SA:CF* 5 mg/m ³ : SCBAF/SAF/HIEF 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, resp tract; abdom pain, nau; jaun; anemia; cachexia; dent pain; excess saliv; jaw pain; swell; burns skin, eyes	Eye: Irr immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, liver, kidneys, jaw, teeth, blood, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: After work it may be contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 10 mg/m ³ : SA*/SCBA* 25 mg/m ³ : SA:CF* 50 mg/m ³ : SCBAF/SAF 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; bronchitis; derm	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 10 mg/m ³ : SA*/SCBA* 25 mg/m ³ : SA:CF* 50 mg/m ³ : SCBAF/SAF 750 mg/m ³ : SA:PD,PP* Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Apnea, coma, convuls; irrit eyes, conj pain, lac, photophobia, keratoconj com vesic; irrit resp sys; dizz; head; fig; irritly, insom; GI dist	Eye: Irr immed Skin: Dust off solid; water flush Breath: Art resp Swallow: Medical attention Immed	Resp sys, CNS, eyes, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	ACGIH 10 ppm: SCBAF/SAF 50 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS*/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; pulm edema; burns eyes, skin	Eye: Irr immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	Resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Phthalic anhydride $C_8H_4O_3$ 85-44-9 T13150000 2214 60	PAN	2 ppm (12 mg/m ³) (ACGIH) 1 ppm (6 mg/m ³)	10,000 ppm	White solid with a characteristic, choking odor	MW: 148 BP: 543°F Sol: 0.82% Fl.P: 304°F	VP: <0.05 mm MP: 268°F UEL: 10.4% LEL: 1.7%	Strong oxidizers Filter; NH ₄ OH; HPLC; M
Picric acid $HO_3C_6H_2(NO_2)_3$ 88-89-1 TJ7875000 1344 33	2,4,6-Trinitrophenol; Lyddite; Pertite; Shimose; Melinite	0.1 mg/m ³	100 mg/m ³	Colorless, yellow solid or liquid	MW: 229 BP: >572°F Sol: 1.4% Fl.P: 302°F	VP: <<1 mm MP: 252°F UEL: ? LEL: ?	Copper, lead, zinc, other metals, salts, plaster, concrete Filter; CH ₃ OH/H ₂ O; HPLC; Set 4
Pival [®] $C_{10}H_{16}O_2$ 83-26-1 NK6300000 2472 53	2-Pivalyl-1,3-Indandione; Pivalyl; Pindone; tert-Butyl-valone; 1,3-Dioxo-2-pivaloyl-indane	0.1 mg/m ³	200 mg/m ³	0.5% concentration: inert solid, bright yellow with almost no odor; usually as a dust	MW: 230 BP: ? Sol: 0.0018% Fl.P: ?	VP: ? MP: 230°F UEL: ? LEL: ?	None hazardous —
Platinum (soluble salts as Pt) Pt 7440-06-4 TP2160000	Synonyms vary depending upon specific compound	0.002 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	None hazardous	Filter; acid; AA M

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat proloug Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	ACGIH 5 ppm: DMXS* 10 ppm: DMXSQ*/SA*/SCBA* 25 ppm: SA:CF*/PAPRDM* 50 ppm: SAF/SCBAF/HIEF 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Conj, nas ulc bleed, upper resp Irrit, bron, asthma, derm	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Resp sys, eyes, skin, liver, kidneys
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam/daily Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 0.5 mg/m ³ : DMXS 1 mg/m ³ : DMXSQ/SA/SCBA 2.5 mg/m ³ : PAPRDM/SA:CF 5 mg/m ³ : HIEF/SCBAF/SAF/ PAPRTHIE/SAT:CF 100 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes; sens derm; yellow-stain hair, teeth; weak, myalgia, anuria, polyuria; bitter taste, GI; hepatitis; hematuria, albuminuria; neph	Eye: Skin: Breath: Swallow: Irr immed Soap wash promptly Art resp Medical attention immed	Kidneys, liver, blood, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: After work it may be contam Remove: N.A.	OSHA 0.5 mg/m ³ : DMXS 1 mg/m ³ : DMXSQ/SA/SCBA 2.5 mg/m ³ : PAPRDM/SA:CF 5 mg/m ³ : PAPRTHIE/SCBAF/ SAF/HIEF/SAT:CF 100 mg/m ³ : SA:PD,PP 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Nosebleed, excess bleeding minor cuts, bruises; smokay urine, black tarry stools; pain abdom, back	Eye: Swallow: Irr immed Medical attention immed	Blood prothrombin
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 0.05 mg/m ³ : SA:CF* 0.1 mg/m ³ : HIEF/SCBAF/SAF 4 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, nose; cough, dysp, wheez, cyan; skin sensitization; lympho- cytoals	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	Resp sys, skin, eyes

Platinum

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Portland cement (less than 1% quartz) 65997-15-1 VV8770000	Hydraulic cement, Cement, Portland cement silicate	50 mppcf (ACGIH) 10 mg/m ³ (total dust)	N.A.	Odorless, gray powder with <1% crystalline silica	BP: N.A. Sol: Insoluble Not combustible	VP: 80 mm MP: N.A.	None hazardous —
Propane CH ₃ CH ₂ CH ₃ 74-98-6 TX2275000 1978 22	Dimethyl methane	1000 ppm (1800 mg/m ³)	20,000 ppm	Color, odorless gas (foul-smelling odorant often added)	MW: 44 BP: -44°F Sol: Insoluble F.I.P.: N.A. IP: 10.95 eV	VP: 8.6 atm MP: -308°F UEL: 9.5% LEL: 2.2%	Strong oxidizers Combustible gas meter; G
beta-Propiolactone C ₃ H ₄ O ₂ 57-57-8 RO7350000	Hydroacrylic acid, beta-lactone; 3-Hydroxypropionic acid; beta-Lactone; 2-Oxetanone; Betaprone; Propanolide; Propiolactone; Propionic acid; 3-Hydroxy-beta-lactone; beta-Propiolactone; beta-Propiolactone; BPL	See Appendix C (NIOSH) (ACGIH) 0.5 ppm, A2	Ca	Colorless liquid with a slightly sweetish odor	MW: 72.1 BP: Decomposes at 323°F Sol: 37 v/v at 25°C F.I.P.: 158°F	VP: 3.4 at 25°C MP: -28°F UEL: ? LEL: 2.9	Acetates, halogens, thiocyanates, and thiosulphates —
n-Propyl acetate CH ₃ COOCH ₂ CH ₂ CH ₃ 109-60-4 AJ3675000 1278 26	Propylacetate; Acetic acid, n-propyl ester	200 ppm (840 mg/m ³)	8000 ppm	Colorless liquid with a mild, fruity odor	MW: 102 BP: 215°F Sol: 2% F.I.P.: 58°F IP: 10.07 eV	VP: 25 mm MP: -140°F UEL: 8% LEL: 2%	Nitrates; strong oxidizers, alkalies, and acids Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 50 mg/m ³ : D 100 mg/m ³ : SA/SCBA:DXSO 250 mg/m ³ : PAPRD/SA:CF 500 mg/m ³ : SCBAF/SAF/HEF/SAT:CF/PAPRTHIE 7500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con Ing	Irrit eyes, nose; cough, expectoration; exertional dysp, wheez, chron bron; dermat	Eye: Irr Immed Skin: Soap wash promptly Breath: Fresh air Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: Prevent skin freezing Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Any wet immed (flamm)	OSHA 10,000 ppm: SA/SCBA 20,000 ppm: SA:CF/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con	Dizz, disorientation, excitation, frostbite	Eye: Irr Immed Skin: Water flush immed Breath: Art resp	CNS
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/SAF:PD,PP: ASCBA ESCAPE: GMFOV/SCBAE	Inh Abs Ing Con	Skin irrit, blistering, burns; com opec; frequent urination, dys; hema; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Kidney, skin, lungs, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV/CCRFOV 5000 ppm: SA:CF* 8000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose, throat; narco; dermat	Eye: Irr Immed Skin: Water flush promptly Breath: Art resp	Resp sys, eyes, skin, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Propyl alcohol CH ₃ CH ₂ CH ₂ OH 71-23-8 UH8225000 1274 26	n-Propyl alcohol, 1-Propanol, Ethyl carbinol	200 ppm (500 mg/m ³)	4000 ppm	Colorless liquid with a mild, non-residual, alcoholic odor	MW: 60 BP: 207°F Sol: Miscible F.P.: 59°F IP: 10.22 eV	VP: 15 mm MP: -195°F UEL: 14% LEL: 2%	Strong oxidizers Char; 2-Propanol in CS ₂ ; GC; III
Propylene dichloride CH ₂ CHClCH ₂ Cl 78-87-5 TX9625000 1279 27	1,2-Dichloropropane	75 ppm (350 mg/m ³)	2000 ppm	Colorless liquid with an odor like chloroform	MW: 113 BP: 205°F Sol: 0.26% F.P.: 60°F IP: 10.87 eV	VP: 40 mm MP: -148°F UEL: 14.5% LEL: 3.4%	Strong oxidizers and acids Char, CS ₂ ; GC; III
Propyleneimine C ₃ H ₅ N 75-55-8 CM8050000 1921 30	2-Methylaziridine	2 ppm (5 mg/m ³) (ACGIH) 2 ppm, A2	500 ppm	Fuming, colorless liquid with a strong ammonia-like odor	MW: 57 BP: 151°F Sol: Miscible F.P.: 25°F	VP: ? MP: -85°F UEL: ? LEL: ?	Acids, strong oxidizers —
Propylene oxide CH ₂ CHOCH ₂ 75-56-9 T22975000 1280 26	1,2-Epoxy propane, Propene oxide, Methyloxirane	100 ppm (240 mg/m ³) (ACGIH) 20 ppm (50 mg/m ³)	2000 ppm	Colorless liquid with an ether-like odor	MW: 58 BP: 94°F Sol: 41% F.P.: -35°F IP: 10.2 eV	VP: 442 mm MP: -170°F UEL: 37% LEL: 2.1%	Anhydrous metal chlorides, iron; strong acids, caustics, peroxides Char, CS ₂ ; GC; F

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: PAPROV/ CCROV* 2000 ppm: SA*/SCBA* 4000 ppm: SA:CF*/SAF/ GMFOV/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	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: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys, GI tract
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	OSHA 750 ppm: CCROV*/SA*/SCBA* 1000 ppm:PAPROV* 1875 ppm: SA:CF* 2000 ppm: GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Eye irrit, drow, li-head, irrit akin	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys, liver, kidneys
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 50 ppm: SA:CF* 100 ppm: SCBAF/SAF 500 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMS/SCBAE	Inh Abs Ing Con	Eye, skin burns	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Eyes, skin
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	ACGIH 200 ppm: SA*/SCBA* 500 ppm: SA:CF* 1000 ppm: SAF/SCBAF 2000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con Ing	Irrit eyes, upper resp, lungs; skin irrit, blister, burns	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
n-Propyl nitrate C ₃ H ₇ NO ₃ 827-13-4 UK0350000 1865 30	None	25 ppm (110 mg/m ³) (ACGIH) 25 ppm (105 mg/m ³)	2000 ppm	Colorless to pale yellow liquid with an ether-like odor	MW: 105 BP: 231°F Sol: Insoluble Fl.P: 68°F	VP: 18 mm MP: <150°F UEL: 100% LEL: 2%	Strong oxidizers, combustibles Char; CS; GC; O
Pyrethrum 8003-34-7 UR4200000 9184 31	Synonyms vary depending upon specific compound	5 mg/m ³	5000 mg/m ³	Viscous brown resin or solid	MW: 316 to 374 BP: N.A. Sol: Insoluble Fl.P(oc): 180 to 190°F	VP: 20 mm MP: ? UEL: ? LEL: ?	Strong oxidizers NIOSH 80-125
Pyridine C ₅ H ₅ N 110-86-1 UR8400000 1282 26	Azabenzene, Azine	5 ppm (15 mg/m ³)	3600 ppm	Colorless to yellow liquid with a penetrating, sickening odor	MW: 79 BP: 239°F Sol: Miscible Fl.P: 88°F IP: 9.27 eV	VP: 18 mm MP: -44°F UEL: 12.4% LEL: 1.8%	Strong oxidizers, strong acids Char; CH ₂ Cl; GC; L
Quinone OC ₆ H ₄ O 106-51-4 DK2625000 2587 55	p-Benzoquinone	0.1 ppm (0.4 mg/m ³)	75 ppm	Pale yellow solid with an acrid odor	MW: 108 BP: Sublimes Sol: 1.5% Fl.P: ? IP: 9.67 eV	VP: 0.1 mm MP: 235°F UEL: ? LEL: ?	Strong oxidizers Ads; Ethanol/ hexane, HPLC; Set 4

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Immed contam non-imperv	OSHA 250 ppm: SA/SCBA 625 ppm: SA/CF 1250 ppm: SAF/SCBAF/SAT/CF 2000 ppm: SA/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS/SCBAE	Inh Ing Con	None known in humans	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	None known
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 50 mg/m ³ : CCRQVDMFu/ SA/SCBA* 125 mg/m ³ : SA/CF/PAPROVDMFu* 250 mg/m ³ : CCRFOVHIE/SAF/SCBAF PAPRTOVHIE* 5000 mg/m ³ : SA/PD,PP* Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Eryt derm, sneezing, asthma; in animals: convuls, paralysis	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, CNS
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	OSHA 125 ppm: SA/CF/PAPROV* 250 ppm: CCRFOV/GMFOV/SCBAF/SAF 3800 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	head; nerv; dizz; insomnia; nau; anor; urine frequent; eye irrit; derm; liver, kidney damage	Eye: Irr immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention immed	CNS, liver, kidneys, skin, GI tract
Clothing: Reason prob Goggles: Any poss Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 2.5 ppm: SA/CF* 5 ppm: SAF/SCBAF 75 ppm: SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Eye irrit, conj keratitis; skin irrit; ulceration of skin	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Rhodium, metal fume and dust (as Rh) Rh 7440-16-6 VI9355000	Synonyms vary depending upon specific compound	0.1 mg/m ³ (ACGIH) 1.0 mg/m ³	N.A.	Gray fume or dust	MW: 103 BP: 4532°F Sol: Insoluble Not combustible	None hazardous	Filter; acid; AA; M
Rhodium, soluble salts (as Rh) Rh 7440-16-6 VI9355000	Synonyms vary depending upon specific compound	0.001 mg/m ³ (ACGIH) 0.01 mg/m ³	N.A.	Red-brown, odorless solid or liquid	Properties vary depending upon specific compound	None hazardous	Filter; acid; AA; M
Ronnel (CH ₃ O) ₂ PSOC ₂ H ₂ Cl ₂ 299-84-3 TG0525000 2922 59	Fenchlorphos; o,o-Dimethyl o-(2,4,5-trichlorophenyl)phosphorothioate	15 mg/m ³ (ACGIH) 10 mg/m ³	5000 mg/m ³	White to tan, waxy solid	MW: 322 BP: Decomposes Sol: 0.0044% Not combustible	VP: 0.0008 mm MP: 95°F	Strong oxidizers NIOSH 80-125
Rotenone (commercial) C ₂₂ H ₁₄ O ₆ 83-79-4 DJ2800000 2922 59	Tubatoxin, "Cube", Derrin	5 mg/m ³	5000 mg/m ³	Colorless to red, odorless solid	MW: 394 BP: Decomposes Sol: 0.00002% F.P.: ?	VP: #0 mm MP: 358°F UEL: ? LEL: ?	Strong oxidizers Filter; CH ₂ CN; HPLC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 0.5 mg/m ³ : DM* 1 mg/m ³ : SA/SCBA/DMXSO* 2.5 mg/m ³ : PAPRDMFu/SA/CF 5 mg/m ³ : HIEF/SCBAF/PAPR- THIE/SAF/SAT/CF 100 mg/m ³ : SA/PD,PP 200 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh	None known in humans	Breath: Swallow:	Art resp Medical attention immed	None known
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 0.01 mg/m ³ : HIE*/SA*/SCBA* 0.025 mg/m ³ : PAPRHIE*/SA/CF* 0.05 mg/m ³ : PAPRTHIE*/HIEF/ SAF/SCBAF 1 mg/m ³ : SA/PD,PP* 2 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Mild eye irrit	Eye: Skin: Breath: Swallow:	Irr immed Water flush Art resp Medical attention immed	Eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	ACGIH 100 mg/m ³ : CCROVDMFu/SA/SCBA 250 mg/m ³ : SA/CF/PAPROVDMFu 500 mg/m ³ : SAF/SCBA/CCRFOVHIE/ GMFHIEOV/PAPRTOVHIE* 5000 mg/m ³ : SA/PD,PP* Q: SCBAF: PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	In animals: chol inhibition; irrit eye; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Skin, liver, kidneys, blood plasma
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work any poss contam Remove: Promptly contam non-imperv	OSHA 5 mg/m ³ : CCROVDMFu/SA/SCBA 125 mg/m ³ : SA/CF/PAPROVDMFu 250 mg/m ³ : SAF/SCBAF/CCRFOVHIE GMFHIEOV/SAT/CF/PAPRTOVHIE 5000 mg/m ³ : SA/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit eyes; numb muc memb; nau, vomit, ab- dom pain; musc tremor, Inco, clonic convuls; stupor; pulm irrit; skin irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	CNS, eyes, resp sys

Rotenone (commercial)

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Selenium compounds (as Se) Se 7782-49-2 VS7700000 2658 53	Synonyms vary depending upon specific compound	0.2 mg/m ³	100 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Acids, strong oxidizing agents	Filter; acid; AA; M
Selenium hexafluoride (as Se) SeF ₆ 7783-79-1 VS9450000 2194 15	None	0.05 ppm (0.4 mg/m ³)	5 ppm	Colorless gas	MW: 193 BP: -31°F Sol: Insoluble Not combustible	None reported	—
Silica (amorphous) SiO ₂ 7631-86-9 VV7310000 1346 32	Diatomite, Silicon dioxide (amorphous), Diatomaceous earth, Diatomaceous silica	20 mppcf (ACGIH) 10 mg/m ³ (total dust)	N.A.	Colorless to gray, odorless powder	MW: 60 BP: N.A. Sol: Insoluble Not combustible	Fluorine, oxygen difluoride, chlorine trifluoride	NIOSH 80-125
Silica (crystalline) SiO ₂ 14806-60-7 VV7330000	Quartz, Cristobalite, Tridymite	10 mg/m ³ / %SiO ₂ + 2 (resp quartz) (NIOSH) 50 µg/m ³ 10-hr TWA (resp free silica) (ACGIH) 0.1 mg/m ³ (resp quartz) 0.05 mg/m ³ (resp cristobalite) 0.05 mg/m ³ (resp tridymite)	N.A.	Colorless, odorless solid, component of many mineral dusts	MW: 60 BP: 4046°F Sol: Insoluble Not combustible	Powerful oxidizers, fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, etc.	Filter, ash; XRD, Color, or IR III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Recommendations vary depending upon specific compound	OSHA 2 mg/m ³ : DMF/SA/SCBA* 75 mg/m ³ : PAPRDM/SA,CF* 10 mg/m ³ : HIEF/SCBAF/SAF 100 mg/m ³ : SAF-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; disturb vis; head; chill, fvr; dysp, bron; metal taste, garlic breath; GI; derm; blur eyes; skin	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Upper resp sys, eyes, skin, liver, kidneys, blood
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 0.5 ppm: SA/SCBA 1.25 ppm: SA,CF 2.5 ppm: SCBAF/SAF/SAT,CF 5 ppm: SA-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Con	None known in humans, in animals: resp irrit, breath difficulties	Breath: Art resp	None known
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 100 mppcf: DM 200 mppcf: DMXSQ/SA/SCBA 500 mppcf: PAPRDM/SA,CF 1000 mppcf: HIEF/PAPR- THIE/SCBAF/SAF/SAT,CF 10,000 mppcf: SA-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: HIEF/SCBAE	Inh	Pneumoconiosis	Eye: Irr immed	Resp sys
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 0.25 mg/m ³ : DM 0.5 mg/m ³ : DMXSQ/SA/SCBA 1.25 mg/m ³ : PAPRDM/SA,CF 2.5 mg/m ³ : HIEF/SCBAF/PAPR- THIE/SAF/SAT,CF 50 mg/m ³ : SA-PD,PP 100 mg/m ³ : SAF-PD,PP Q: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: HIEF/SCBAE	Inh	Cough, dysp, wheez, im- paired pulm func, pro- gressive symptoms	Eye: Irr immed Breath: Fresh air	Resp sys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Silver, metal, and soluble compounds (as Ag) Ag 7440-22-4 VW3500000	Synonyms vary depending upon specific compounds	0.01 mg/m ³ (ACGIH) 0.1 mg/m ³ (metal) 0.01 mg/m ³ (soluble compounds)	N.A.	Appearance and odor vary depending upon specific compounds	Properties vary depending upon specific compound	Acetylene, ammonia, hydrogen peroxide	Filter; acid; IEP; III
Soapstone 3MgO·4SiO ₂ ·H ₂ O VV8780000	Massive talc, Steatite, Soapstone silicate	20 mppcf (ACGIH) 3 mg/m ³ (resp dust) 8 mg/m ³ (total dust)	N.A.	Odorless solid; < 10% tremolite, < 1% silica, crystalline	MW: 378 BP: N.A. Sol: Insoluble Not combustible	VP: 20 mm MP: N.A.	None hazardous —
Sodium fluoroacetate CH ₂ FCOONa 62-74-8 AH9100000 2629 53	1080, Sodium monofluoroacetate, SFA	0.05 mg/m ³	5 mg/m ³	Fluffy, colorless, odorless, hygroscopic solid (sometimes dyed black)	MW: 100 BP: Decomposes Sol: 111% Not combustible	VP: 20 mm MP: 392°F	None hazardous NIOSH 79-141
Sodium hydroxide NaOH 1310-73-2 WB4900000 1823 80	Caustic soda, Soda lye, Lye	2 mg/m ³ (NIOSH) 2 mg/m ³ 15-min cell (ACGIH) 2 mg/m ³ cell	250 mg/m ³	Colorless, odorless solid	MW: 40 BP: 2534°F Sol: 50% Not combustible	VP: 20 mm MP: 590°F	Water, acids, flammable liquids, organic halogens, metals; aluminum, tin, zinc; nitromethane and nitro compounds Filter; 0.01 N HCl, titration (NaOH); III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash	OSHA 0.25 mg/m ³ : SA:CF ₂ /PAPRHI _E 0.5 mg/m ³ : HIEF/SCBAF/SAF 20 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Blue-gray eyes, nasal septum, throat, skin; Irrit skin, ulceration; GI	Eye: Irr Skin: Irr Breath: Art resp Swallow: Medical attention Irrmed Water flush Art resp Medical attention Irrmed	Nasal septum, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 100 mppcf: DM 200 mppcf: DMXSQ/HIE/SA/SCBA 500 mppcf: PAPRD/SA:CF 1000 mppcf: HIEF/SCBAF/SAF PAPRTHIE ⁺ /SAT:CF ⁺ 10,000 mppcf: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Cough, dysp, digital clubbing, cyan, basal crackles, cor pulmonale	Eye: Irr Breath: Art resp Irrmed Art resp	Lungs, CVS
Clothing: Any poss Goggles: Reason prob Wash: Irrmed upon contam Change: After work any poss contam Remove: Irrmed contam non-imperv Provide: Quick drench	OSHA 0.25 mg/m ³ : DMXS 0.5 mg/m ³ : DMXSQ/SA/SCBA 1.25 mg/m ³ : PAPRDM/SA:CF 2.5 mg/m ³ : PAPRTHIE/SAF/SCBAF/HIEF/ SAT:CF 5 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Vomit; halo; nystagmus; pares; twitch face musc; convuls; pulsus alternans; ectopic heartbeat, tachard; ventfib; pulm edema	Eye: Irr Skin: Irr Breath: Art resp Swallow: Medical attention Irrmed Water flush Art resp Medical attention Irrmed	CVS, lungs, kidneys, CNS
Clothing: Any poss Goggles: Any poss Wash: Irrmed upon contam Change: After work it may be contam Remove: Irrmed contam non-imperv Provide: Eyewash, quick drench	NIOSH 50 mg/m ³ : PAPRDM/SA:CF ⁺ 100 mg/m ³ : SCBAF/SAF/HIEF 250 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit nose; pneumonitis; burns eyes, skin; temporary loss of hair	Eye: Irr Skin: Irr Breath: Art resp Swallow: Medical attention Irrmed Water flush Art resp Medical attention Irrmed	Eyes, resp sys, skin

Sodium hydroxide

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Silbine SbH ₃ 7803-52-3 WJ0700000 2678 18	Hydrogen antimonide, Antimony trihydride	0.1 ppm (0.5 mg/m ³)	40 ppm	Colorless gas with a disagreeable, hydrogen sulfide-like odor	MW: 125 BP: 1°F Sol: 0.1% F.P.: N.A. IP: 9.58 eV	VP: >1 atm MP: -126°F UEL: ? LEL: ?	Acids, halogenated hydrocarbons, oxidizers, moisture Ads; HCl; color; Set 2
Stoddard solvent C ₆ H ₁₄ 8052-41-3 WJ8925000	Dry cleaning safety solvent, Mineral spirits	500 ppm (2900 mg/m ³) (NIOSH) 350 mg/m ³ 10-hr TWA (1800 mg/m ³) 15-min cell (ACGIH) 100 ppm (525 mg/m ³)	5000 ppm	Colorless liquid with a kerosene-like odor	MW: 91.44 BP: 302 to 329°F Sol: Insoluble F.P.: 102 to 140°F	VP: 92 mm MP: ? UEL: ? LEL: 0.8%	Strong oxidizers Char; CS ₂ ; GC; III
Strychnine C ₂₁ H ₃₃ N ₇ O ₂ 57-24-9 WL2275000 1692 53	None	0.15 mg/m ³	3 mg/m ³	Colorless, odorless solid	MW: 334 BP: Decomposes Sol: 0.02% Not combustible	VP: 90 mm MP: 547°F	Strong oxidizers Filter; ion pair reagent; HPLC; Set 6
Styrene C ₆ H ₅ .CHCH ₂ 100-42-5 WL3675000 2055 27	Phenylethylene, Vinylbenzene, Cinnamene, Styrene monomer	100 ppm 200 ppm cell 600 ppm 5 min/3-hr peak (NIOSH) 50 ppm 10-hr TWA 100 ppm 15-min cell (ACGIH) 50 ppm	5000 ppm	Colorless liquid with a sweet, aromatic odor at low concentrations, sharp, penetrating, disagreeable odor at higher levels	MW: 104 BP: 293°F Sol: 0.03% F.P.: 90°F IP: 8.47 eV	VP: 4.5 mm MP: -23°F UEL: 6.1% LEL: 1.1%	Oxidizers, catalysts for vinyl polymers; peroxides, strong acids, aluminum chloride Char; CS ₂ ; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 1.0 ppm: SA/SCBA 2.5 ppm: SA:CF 5 ppm: SCBAF/SAF/SAT:CF 40 ppm: SA:PD,PP Q: 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: Art resp	Blood, liver, kidneys, lungs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	NIOSH 3500 mg/m ³ : SA*/SCBA*CCROV* 5900 mg/m ³ : PAPROV*/CCRFOV 14,750 mg/m ³ : SA:CF* 29,500 mg/m ³ : GMFOV/SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, nose, throat; dizz; derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, eyes, resp sys, CNS
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: After work any poss contam Remove: N.A.	OSHA 0.75 mg/m ³ : DMXS 1.5 mg/m ³ : DMXSQ/SA/SCBA 3 mg/m ³ : PAPRDM/SA:CF/HIEF/ SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Stiff neck, fasc musc, restless, apprehension, acuity of perception, reflex excitability, cyan, tetanic convuls, opisthotonos	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet Immed (flamm)	NIOSH 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: CCRFOV*/PAPROV* 1250 ppm: SA:CF* 2500 ppm: GMFOV/SAF/SCBAF 5000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; drow, weak, unsteady gait; nar-co; defatting derm	Eye: Irr immed Skin: Water flush Breath: Art resp Swallow: Medical attention immed	CNS, resp sys, eyes, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Sulfur dioxide SO ₂ 7446-09-5 WS4550000 1079 16	None	5 ppm (13 mg/m ³) (NIOSH) 0.5 ppm 10-hr TWA (ACGIH) 2 ppm (5 mg/m ³)	100 ppm	Colorless liquid or gas with a characteristic, pungent odor; can be liquid at <14°F	MW: 64 BP: 14°F Sol: 10% Not combustible IP: 12.3 eV	VP: >1 atm MP: -104°F Powdered and alkali metals such as sodium, potassium	NIOSH 79-141
Sulfuric acid H ₂ SO ₄ 7664-93-9 WS5600000 1831 39	Oil of vitriol	1 mg/m ³ (NIOSH) 1 mg/m ³ 10-hr TWA	80 mg/m ³	Colorless to dark brown, oily liquid; odorless	MW: 98 BP: 518°F Sol: Miscible Not combustible, but highly reactive	VP: < 0.001 mm MP: 37°F Organics: chlorates, carbides, fulminates, picrates, metals	SiO ₂ ; NaHCO ₃ ; IC; It
Sulfur monochloride S ₂ Cl ₂ 10025-67-9 WS4300000 1828 39	Sulfur chloride, Sulfur subchloride	1 ppm (6 mg/m ³) (ACGIH) 1 ppm cell (6 mg/m ³)	10 ppm	Amber to red, fuming, oily liquid with a pungent, nauseating, irritating odor	MW: 135 BP: 280°F Sol: Reacts Fl.P: 245°F	VP: 6.8 mm MP: -105°F UEL: ? LEL: ? Peroxides, oxides of phosphorous, organics; water	—
Sulfur pentafluoride S ₂ F ₁₀ 5714-22-7 WS4480000	Disulfur decafluoride	0.025 ppm (0.25 mg/m ³) (ACGIH) 0.01 ppm cell (0.1 mg/m ³)	1 ppm	Colorless liquid or gas with an odor like sulfur dioxide	MW: 254 BP: 84°F Sol: insoluble Not combustible	VP: 561 mm MP: -67°F None reported	—

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Prevent skin freezing Goggles: Any poss Wash: N.A. Change: N.A. Remove: Any wet immed Provide: Eyewash	NIOSH 5 ppm: SA*/SCBA*/ICCRS* 12.5 ppm: SA:CF*/PAPRS* 25 ppm: SAF/SCBA*/ICCRSF/GMFS 100 ppm: SAF:PD,PP Q: 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: Irr immed Skin: Water flush immed Breath: Art resp	Resp sys, skin, eyes
Clothing: > 1% AP/4 1% RP Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: > 1% Eyewash, quick drench	NIOSH 25 mg/m ³ : PAPHIEAG*/SA:CF* 50 mg/m ³ : CCRAGFHIE/SCBAF/SAF/GMFHIEAG 80 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFHIEAG/SCBAE	Inh Ing Con	Eye, nose, throat irrit; pulm edema, bron emphysema; conj; stomatitis; dent erosion; trachbronc; skin, eye, burns; derm	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin, teeth
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 10 ppm: PAPRS*/ICCRSF/ GMFS/SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con Ing	Lac; cough; burn eyes, skin; pulm edema	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: Any poss Goggles: Any poss Wash: N.A. Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 0.25 ppm: SA/SCBA 0.625 ppm: SA:CF 1 ppm: SCBAF/SAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	Ing Con	In animals: breath difficulties	Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Sulfuryl fluoride SO_2F_2 2699-79-8 WT5075000 2191 15	None	5 ppm (20 mg/m ³)	1000 ppm	Colorless, odorless gas	MW: 102 BP: -67 °F Sol: 0.16% Not combustible IP: 13.3 eV	VP: > 1 atm MP: -213 °F	None hazardous —
2,4,5-T $\text{Cl}_2\text{C}_6\text{H}_2\text{OCH}_2\text{COOH}$ 93-76-5 AJ8400000 2785 55	2,4,5-Trichlorophenoxy-acetic acid	10 mg/m ³	5000 mg/m ³	Colorless to tan, odorless solid	MW: 256 BP: Decomposes Sol: 0.03% Not combustible	VP: #0 mm MP: 318 °F	None hazardous Filter: CH ₂ OH; HPLC; III
Talc (non- <i>asbestiform</i>) 14807-86-6 VV7720000	Hydrated magnesium silicate, Steatite talc, Non-fibrous talc, Non- <i>asbestiform</i> talc	20 mppcf (ACGIH) 2 mg/m ³ (resp dust)	N.A.	Odorless solid	MW: ≈ 295 BP: N.A. Sol: insoluble Not combustible	VP: #0 mm MP: 1652 to 1832 °F	None hazardous —
Tantalum metal, oxide dusts (as Ta) Ta 7440-25-7 WW5505000	Synonyms vary depending upon specific compound	5 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers	—

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards				
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs	
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 50 ppm: SA*/SCBA* 125 ppm: SA,CF* 250 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Conj, rhin, phar, pares	Eye: Breath:	Irr Immed Art resp	Resp sys, CNS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 50 mg/m ³ : DMXS 100 mg/m ³ : DMXSQ/SA/SCBA 250 mg/m ³ : SA:CF/PAPRDM 500 mg/m ³ : HIEF/SAF/ PAPRTHIE/SCBAF/SAT:CF 5000 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Animal studies: ataxia, skin irrit, acne-like rash, blood in stool	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Art resp Medical attention Immed	Skin, liver, GI tract
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 10 mg/m ³ : DM 20 mg/m ³ : DMXSQ/SA/SCBA 50 mg/m ³ : PAPRDM/SA:CF 100 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 2000 mg/m ³ : SA:PD,PP 4000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Fibrotic pneumoconiosis	Eye:	Irr immed	Lungs, CVS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 25 mg/m ³ : DM* 50 mg/m ³ : DMXSQ*/DMFu/SA/SCBA 125 mg/m ³ : PAPRDM*/SA:CF 250 mg/m ³ : HIEF/PAPRTHIE/SCBAF/SAF/SAT:CF 5000 mg/m ³ : SA:PD,PP 7500 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	None known in humans	Breath:	Art resp	None known in humans

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
TEDP (C ₄ H ₈) ₂ P ₂ S ₂ O ₈ 3688-24-5 XN4375000 1704 55	Tetraethyl pyrophosphorodithionate, Sulfotapp, Tetraethyl dithiono-pyrophosphate, Tetraethyl dithiopyrophosphate	0.2 mg/m ³	35 mg/m ³	Yellow liquid with a garlic odor	MW: 322 BP: Decomposes Sol: 0.0025% Not combustible	VP: ? MP: ? Strong oxidizers	Ads(2); toluene; GC; III
Tellurium compounds (as Te) Te 13484-80-9 WY2625000	Synonyms vary depending upon specific compound	0.1 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Hazards vary depending upon specific compound	Filter; acid; AA; N
Tellurium hexafluoride (as Te) TeF ₆ 7783-80-4 WY2800000 2195 15	None	0.02 ppm (0.2 mg/m ³)	1 ppm	Colorless gas with a repulsive odor	MW: 242 BP: -38°F Sublimes Sol: Reacts slowly Not combustible	VP: >1 atm MP: -36°F (triple point) None hazardous	Char; NaOH; AA; M
TEPP (C ₂ H ₅) ₂ P ₂ O ₆ 107-49-3 UX6825000 2784 57	Tetraethyl pyrophosphate, Commercial 40%, Ethyl pyrophosphate, Bidadan, Nifost, Vapofone, Tetron, Killax, Moropal	0.05 mg/m ³	10 mg/m ³	Colorless to amber liquid with a faint, fruity odor	MW: 290 BP: Decomposes Sol: Miscible Not combustible	VP(284 °F): 1 mm MP: 32°F Strong oxidizers	—

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 2 mg/m ³ : SA/SCBA 5 mg/m ³ : SA:CF 10 mg/m ³ : SAF/SCBAF 35 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Eye pain, vision, tears, head, cyan, anor, nau, vomit, diarr, local sweat, weak, twitch, paralysis, Cheyne-Stokes resp, convul, low BP, cardiac	Eye: Irr Immed Skin: Soap wash Immed Breath: Art resp Swallow: Medical attention Immed	CNS, resp sys, CVS
Recommendations vary depending upon specific compound	OSHA 0.5 mg/m ³ : DMXS ^a 1 mg/m ³ : SA/SCBA/DMXSQ ^a /DMFu 2.5 mg/m ³ : PAPRDM ^a /SA:CF 5 mg/m ³ : PAPRTHIE/SCBAF/SAT:CF/HIEF 50 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Garlic odor on breath, sweat; dry mouth, metal taste; somnolence; anor, nau; no sweat; derm	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Immed	Skin, CNS
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 0.2 ppm: SA/SCBA 0.5 ppm: SA:CF 1 ppm: SCBAF/SAF/SAT:CF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head, dysp, garlic odor on breath	Breath: Art resp	Resp sys
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 0.5 mg/m ³ : SA/SCBA 1.25 mg/m ³ : SA:CF 2.5 mg/m ³ : SAF/SCBAF/SAT:CF 10 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Eye pain, vision, tears, head, chest, cyan, anor, nau, vomit, diarr, local sweat, weak, twitch, paralysis, Cheyne-Stokes resp, convul, low BP, cardiac	Eye: Irr Immed Skin: Water flush Immed Breath: Art resp Swallow: Medical attention Immed	CNS, resp sys, CVS, GI tract

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measur Methoc Table and	See (See 1a b)
Terphenyls C ₁₈ H ₁₄ 92-94-4 WZ8475000	Triphenyls, ortho-Terphenyl, meta-Terphenyl, para-Terphenyl. Mixed terphenyls, Diphenyl benzenes	1 ppm cell (9 mg/m ³) (ACGIH) 0.5 ppm cell (5 mg/m ³)	3500 mg/m ³	Colorless or light-yellow solid	MW: 230 BP: 630 to 718 °F Sol: Insoluble Fl.P(oc): 325 to 405 °F	VP: ? MP: 133 to 415 °F UEL: ? LEL: ?	None hazardous	Filter; CS; GC; C
1,1,2,2-Tetrachloro-1,2-difluoroethane CCl ₂ F-CCl ₂ F 78-12-0 KI1420000 1078 12	Refrigerant 112, Halocarbon 112, Freon 112	500 ppm (4170 mg/m ³)	15,000 ppm	Colorless liquid or solid with a slight ether-like odor	MW: 204 BP: 199 °F Sol: 0.01% Not combustible	VP: 40 mm MP: 79 °F	Chemically active metals: sodium, potassium, beryllium, powdered aluminum, zinc, magnesium	Char; CS; GC; I
1,1,1,2-Tetrachloro-2,2-difluoroethane CCl ₂ F-CClF ₂ 78-11-9 KI1425000 1078 12	Refrigerant 112a; Halocarbon 112a; 2,2-Difluoro-1,1,1,2-Tetrachloroethane; Freon 112a	500 ppm (4170 mg/m ³)	15,000 ppm	Colorless liquid or solid with a slight ether-like odor	MW: 204 BP: 197 °F Sol: 0.01% Not combustible	VP: 40 mm MP: 105 °F	Chemically active metals: sodium, potassium, beryllium, powdered aluminum, zinc, magnesium	Char; CS; GC; I
1,1,2,2-Tetrachloroethane CHCl ₂ CHCl ₂ 79-34-5 KI8575000 1702 55	Symmetrical tetrachloroethane, Acetylene tetrachloride, sym-tetrachloroethane	5 ppm (35 mg/m ³) (NIOSH) Lowest detectable limit (ACGIH) 1 ppm (7 mg/m ³)	Ca	Colorless to pale yellow liquid with a sickly sweet odor like chloroform	MW: 188 BP: 295 °F Sol: 0.29% Not combustible IP: 11.1 eV	VP: 8 mm MP: -45 °F	Chemically active metals: strong caustics; hot iron, aluminum, zinc in presence of steam	Char; CS; GC; I

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: AP molten/RP liq-sol Goggles: AP molten/reas prob liq-sol Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash, quick drench	ACGIH 125 mg/m ³ : PAPRDM/SA/CF+ 250 mg/m ³ : SCBAF/SAF/HIEF 3500 mg/m ³ : SAF/PD,PP Ω: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, thermal burns	Eye: Irr Immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Skin, resp sys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 5000 ppm: SA/SCBA 12,500 ppm: SA:CF 15,000 ppm: SCBAF/SAF Ω: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin, conj, pulm edema	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Lungs, skin
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	OSHA 5000 ppm: SA/SCBA 12,500 ppm: SA:CF 15,000 ppm: SCBAF/SAF Ω: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	CNS depres, pulm edema, skin irrit, eye ir- rit, droway, dysp	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH Ω: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit, abdom pain, tremor fingers, jaun, ani tend liver, derm, monocy, kidney damage, pares	Eye: Irr Immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Liver, kidneys, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Tetrachloroethylene CCl ₂ CCl ₂ 127-18-4 KX3850000 1897 74	Perchloroethylene, Perchloroethylene, Tetrachloroethylene, Perk	100 ppm 200 ppm ceil 300 ppm/ 5 min/3-hr peak (NIOSH) lowest feasible limit See Appendix A (ACGIH) 50 ppm	Ca	Colorless liquid with an odor like ether or chloroform	MW: 186 BP: 250°F Sol: 0.015% Not combustible IP: 9.32 eV	VP: 14 mm MP: -8°F Strong oxidizers, chemically active metals, such as barium, lithium, beryllium	Char; CS; GC; J
Tetrachloronaphthalene C ₁₀ H ₆ Cl ₄ 1335-86-2 QK3700000	Halowax, Seekay wax, Nibren wax	2 mg/m ³	20 mg/m ³	Colorless to pale yellow solid with an aromatic odor	MW: 266 BP: 800 to 680°F Sol: Insoluble Fl.P(oc): 410°F	VP: <1 mm MP: 239°F UEL: ? LEL: ?	Strong oxidizers Filter/bub; iso-octane, GC, I
Tetraethyl lead (as Pb) Pb(C ₂ H ₅) ₄ 78-00-2 TP4550000 1649 56	TEL, Lead tetraethyl, Motor fuel anti-knock compound	0.075 mg/m ³	40 mg/m ³	Colorless liquid or dyed red, orange, or blue with a slight musty odor	MW: 323 BP: 212°F Sol: Insoluble Fl.P: 200°F IP: 11.1 eV	VP: 0.2 mm MP: -216 to -202°F UEL: ? LEL: ?	Strong oxidizers, sulfuryl chloride, potassium permanganate Ads; pentane; GC; Set 3
Tetrahydrofuran C ₄ H ₈ O 109-99-9 LU5950000 2056 26	Diethylene oxide, Tetramethylene oxide, THF	200 ppm (590 mg/m ³)	20,000 ppm	Colorless liquid with an ether-like odor	MW: 72 BP: 151°F Sol: Miscible Fl.P: 6°F	VP: 145 mm MP: -163°F UEL: 11.8% LEL: 2%	Strong oxidizers Char; CS; GC; F

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; nausea; flush face, neck; vertigo, dizziness; inco; head; sore; erythema; [cancer]	Eye: Irrimed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention Irrimed	Liver, kidneys, eyes, upper resp sys, CNS
Clothing: AP molt or Fu/FP sol or liq Goggles: AP molt/FP sol or liq Wash: Promptly upon contam Change: May be contam solid Remove: Irrimed contam non-imperv molt/promptly solid	OSHA 20 mg/m ³ : SAF/SCBAF Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Acneform dermatitis, head, fatigue, anorexia, vertigo, jaundice, liver injury	Eye: Irrimed Skin: Soap wash Breath: Art resp Swallow: Medical attention Irrimed	Liver, skin
Clothing: Any poss (>0.1%) Goggles: Reason poss Wash: N.A. Change: After work AP contam (>0.1%) Remove: Imm contam non-imperv (>0.1%) Provide: Quick drench (>0.1%)	OSHA 0.75 mg/m ³ : SA/SCBA 1.875 mg/m ³ : SA:CF 3.75 mg/m ³ : SCBAF/SAFSAT:CF 40 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insomnia, less anxiety tremor, hyperreflexia, spastic, bradycardia, hypotension, hypothermia, pallor, nausea, anorexia, low- weight, halucinations, convulsions, coma, eye irrit	Eye: Irrimed Skin: Soap wash Breath: Art resp Swallow: Medical attention Irrimed	CNS, CVS, kidneys, eyes
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet Irrimed (flamm)	OSHA 1000 ppm: PAPROV/OCROV 5000 ppm: SA:CF- 10,000 ppm: GMFOV/SCBAF/SAF 20,000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, upper resp; nausea; dizziness; head	Eye: Irrimed Skin: Water flush promptly Breath: Art resp Swallow: Medical attention Irrimed	Eyes, skin, resp sys, CNS

Tetrahydrofuran

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Tetramethyl lead (as Pb) $Pb(CH_3)_4$ 75-74-1 TP4725000 1649 56	TML, Lead tetramethyl, Motor fuel anti-knock compound	0.075 mg/m ³	40 mg/m ³	Colorless liquid or dyed red, orange, or blue with a slight musty odor	MW: 287 BP: 230°F Sol: Insoluble F.P.: 100°F IP: 9.3 eV	VP: 22 mm MP: -22°F UEL: ? LEL: ?	Strong oxidizers, such as sulfuryl chloride or potassium permanganate	NIOSH 78-175
Tetramethyl succinonitrile $(CH_3)_2C(CN)C(CN)(CH_3)_2$ 3333-52-6 WN4025000	TMSN	0.5 ppm (3 mg/m ³) (NIOSH) 1 ppm (8 mg/m ³) 15-min cell	5 ppm	Colorless, odorless solid	MW: 136 BP: Sublimes Sol: Insoluble F.P.: ?	VP: ? MP: 338°F UEL: ? LEL: ?	Strong oxidizers	Char. CS ₂ ; GC; K
Tetranitromethane $C(NO_2)_4$ 509-14-8 PB4025000 1510 47	Tetan	1 ppm (8 mg/m ³)	5 ppm	Colorless to pale yellow liquid or solid with a pungent odor; causes tears	MW: 196 BP: 259°F Sol: Insoluble Not combustible	VP: 8.4 mm MP: 57°F	Hydrocarbons, alkalis, metals	Imp: ethyl acetate GC; Q
Tetryl $(NO_2)_3C_6H_2N(NO_2)CH_3$ 479-45-8 BY6300000	2,4,6-Trinitrophenylmethyl nitramine; N-Methyl-N-2,4,6-trinitroaniline; Nitramine; Tetralite	1.5 mg/m ³	N.A.	Colorless to yellow, odorless solid	MW: 287 BP: 369°F Sol: 0.02% F.P.: Explodes	VP: <<1 mm MP: 264°F	Oxidizable materials	Filter; DEEA, color; Q

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss (>1.06%) Goggles: Reason prob Wash: N.A. Change: N.A. Remove: Immed contam non-imperv >1.06% Provide: Quick drench (>1.06%)	OSHA 0.75 mg/m ³ : SA/SCBA 1.875 mg/m ³ : SA/CF 3.75 mg/m ³ : SCBAF/SAF/SAT/CF 40 mg/m ³ : SA/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insom, bad dreams, restless, anxious; hypotension; nau, anor, delirium; mania, convuls; coma	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	CNS, CVS, kidneys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 5 ppm: SA/SCBA Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Head, nau; convuls, coma	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS
Clothing: Reason prob Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Any wet immed (flam) Provide: Eyewash	OSHA 5 ppm: SA/CF*/PAPRS**ICRSF*/ GMFS/SCBAF/SAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFS*/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; dizz, head; chest pain, dysp; methhemog, cyan; skin burns	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin, blood, CNS
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam/daily Change: After work it may be contam Remove: Promptly contam non-imperv	OSHA 7.5 mg/m ³ : DMXS 15 mg/m ³ : DMXSQ*/SA*/SCBA* 37.5 mg/m ³ : PAPROM*SA/CF* 75 mg/m ³ : HIEF/SCBAF/SAF 3000 mg/m ³ : SAF/PD,PP Q: 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; epis; indo-cyclitis; sneez; cough, coryza; irit, itg, mal, head, lass, insom, nau, vomit; anemia	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, CNS, skin; in animals: liver, kidneys

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Thallium, soluble compounds (as Tl) TI 7440-28-0 XG34250000 1707 53	Synonyms vary depending upon specific compound	0.1 mg/m ³	20 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	None hazardous	Filter: acid; AA; U
Thiram C ₂ H ₄ N ₂ S ₂ 137-26-8 JO1400000 2771 55	Tetramethylthiuram disulfide	5 mg/m ³	1500 mg/m ³	Colorless to cream solid (some commercial products dyed blue)	MW: 240 BP: Decomposes Sol: Insoluble Fl.P: 192 °F VP: ≥0 mm MP: 284 °F MEC: ?	Strong oxidizers and acids, oxidizable materials	Filter: CH ₃ CN; HPLC; III
Tin, inorganic compounds except oxides (as Sn) Sn 7440-31-5 XP7320000	Synonyms vary depending upon specific compound	2 mg/m ³	400 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Chlorine, turpentine; for stannic chloride: water, alcohols, amines	Filter: AA; N
Tin, organic compounds (as Sn) Sn 7440-31-5 XP7320000	Synonyms vary depending upon specific compound	0.1 mg/m ³ (NIOSH) 0.1 mg/m ³ 10-hr TWA	200 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Strong oxidizers	NIOSH 77-157A

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly upon contam	OSHA 0.5 mg/m ³ : DMXS ^a 1 mg/m ³ : DMXSQ ^a /SA/SCBA 2.5 mg/m ³ : PAPRDM ^a /SA/CF 5 mg/m ³ : HIEF/SAF/SCBAF/ PAPRTHIE/SAT/CF 20 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Nau, diarr, abdom pain; ptosis, strabismus; peri neurit tremor; pares legs, retster chest pain, pulm edema; sez chor psypc	Eye: Skin: Breath: Swallow: Irr immed Water flush promptly Art resp Medical attention immed	Eyes, CNS, lung, liver, kidneys, GI tract, body hair
Clothing: Reason prob Goggles: Reason prob Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv	OSHA 50 mg/m ³ : CCROVDMF ^a /SA ^a /SCBA ^a 125 mg/m ³ : PAPROVDMF ^a /SA/CF ^a 250 mg/m ³ : SCBAF/CCRFOVHIE/SAF/ PAPRTOVHIE/GMFHIEOV 1500 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Ing Con	Irrit muc memb; derm; with ethanol consump- tion: flush, eryt, pruritis, urticaria, head, nau, vomit, diarr, weak, dizz, diff breath	Eye: Skin: Swallow: Irr immed Soap wash promptly Medical attention immed	Resp sys, skin
Recommendations vary depending upon specific compound	OSHA 10 mg/m ³ : DMXS ^a 20 mg/m ³ : DMXSQ ^a /SA ^a /SCBA ^a 50 mg/m ³ : PAPRDM ^a /SA/CF 100 mg/m ³ : HIEF/SCBAF/SAF 400 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	Eyes, skin, resp sys
Recommendations vary depending upon specific compound	NIOSH 1 mg/m ³ : CCROVDM/SA/SCBA 2.5 mg/m ³ : SA/CF/PAPROVDM 5 mg/m ³ : CCRFOVHIE/SAF/SCBAF/ GMFHIEOV/PAPRTOVHIE/SAT/CF 200 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs Ing Con	Head, vert; irrit eyes; psycho neuro dist; sore throat, cough; abdom pain, vomit, urine reten- tion; paresis; skin burn, pruritis	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Art resp Medical attention immed	CNS, eyes, liver, urinary tract, skin, blood

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Titanium dioxide TiO ₂ 13463-67-7 XR2275000 2546 37	Rutile, Anatase, Brookite	15 mg/m ³ (ACGIH) 10 mg/m ³ (total dust <1% quartz) 5 mg/m ³ (resp dust)	N.A.	White powder, odorless	MW: 80 BP: <5432°F Sol: Insoluble Not combustible	VP: 20 mm MP: 2984°F	None hazardous Filter; acid; AA; O
Toluene C ₆ H ₅ CH ₃ 108-88-3 XS5250000 1294 27	Toluol, Phenyl methane, Methyl benzene	200 ppm 300 ppm cell 500 ppm 10-min peak (NIOSH) 100 ppm 10-hr TWA 200 ppm 10-min cell (ACGIH) 100 ppm	2000 ppm	Colorless liquid with an aromatic odor like benzene	MW: 92 BP: 231°F Sol: 0.05% F.P.: 40°F IP: 8.82 eV	VP: 22 mm MP: -139°F UEL: 7.1% LEL: 1.3%	Strong oxidizers Char; CS ₂ ; GC; V
Toluene-2,4-diisocyanate CH ₂ C ₆ H ₃ (NCO) ₂ 584-84-9 CZ6300000 2078 57	TDI; 2,4-Toluene diisocyanate	0.02 ppm cell (0.14 mg/m ³) (NIOSH) 35 µg/m ³ 10-hr TWA 140 µg/m ³ 10-min cell (ACGIH) 0.005 ppm	10 ppm	Colorless, yellow, or dark liquid or solid with a sweet, fruity, pungent odor	MW: 174 BP: 484°F Sol: Rx, slow F.P.: 270°F	VP: 20.04 mm MP: 71°F UEL: 9.5% LEL: 0.9%	Strong oxidizers, water, acids, bases, amines, etc., cause foam and spatter Imp/reaagent; acetic anhydride; HPLC; III
o-Toluidine CH ₃ C ₆ H ₄ NH ₂ 95-53-4 XU2975000 1708 55	ortho-Aminotoluene; o-Methylaniline; 1-Methyl-1,2-amino-benzene, 2-Methylaniline	5 ppm (22 mg/m ³) (ACGIH) 2 ppm, A2 (9 mg/m ³ , A2)	100 ppm	Colorless to pale yellow liquid with a weak, aromatic odor	MW: 107 BP: 391°F Sol: 1.5% F.P.: 185°F IP: 7.6 eV	VP: <1 mm MP: -3°F UEL: ? LEL: 1.5%	Strong oxidizers SiO ₂ ; CH ₃ CH ₂ OH; GC; L

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	ACGIH 50 mg/m ³ : DM* 100 mg/m ³ : DMXSO*/SA/SCBA 250 mg/m ³ : PAPRDM*/SA:CF 500 mg/m ³ : HIEF/PAPRTHIE/SCBAF/SAF/ SAT:CF 7500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Slight lung fibrosis	Breath: Art resp	Lungs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: CCROV*/SA* PAPROV*/SCBA* 2000 ppm: SA:CF*SCBAF/SAF/ GMFOV Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Ftg. weak; conf, euph, dizz; head; dil pup, lac; ner; musc ftg; insom; pares; derm; photo	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS, liver, kidneys, skin
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non- imperv Provide: Eyewash, quick drench	NIOSH 0.05 ppm: SA*/SCBA* 0.125 ppm: SA:CF* 1 ppm: SCBAF/SAF 10 ppm: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit nose, throat; choke, parox cough; retster pain; nau, abdom pain; bron spas, pulm edema; asth; conj; derm	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, skin
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	NIOSH Q: 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	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, kidneys, liver, CVS, skin, eyes

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Tributyl phosphate (C ₄ H ₉ O) ₃ PO 126-73-8 TC770000	Tri-n-butyl phosphate, TBP	5 mg/m ³ (ACGIH) 0.2 ppm (2.5 mg/m ³)	1300 mg/m ³	Colorless to pale yellow, odorless liquid	MW: 266 BP: 550°F Sol: 0.1% Fl.P: 330°F	VP: Very low MP: -112°F UEL: ? LEL: ?	None hazardous Filter; ether; GC; P
1,1,2-Trichloroethane CHCl ₂ CH ₂ Cl 79-00-5 KJ3150000 2831 74	Vinyl trichloride, beta-Trichloroethane	10 ppm (45 mg/m ³) (NIOSH)	Ca	Colorless liquid with a sweet odor like chloroform	MW: 133 BP: 236°F Sol: 0.5% Fl.P: None	VP: 19 mm MP: -34°F UEL: 15.5% LEL: 6%	Strong oxidizers and caustics, chemically active metals, such as aluminum, magnesium powders, sodium, potassium Char; CS; GC; J
Trichloroethylene CHClCCl ₂ 79-01-6 KX4550000 1710 74	Ethylene trichloride, Triclene	100 ppm 200 ppm ceiling 300 ppm 5-min/2hr peak (NIOSH) 25 ppm 10-hr TWA See Appendix A (ACGIH) 50 ppm	Ca	Colorless liquid, unless dyed, with a sweet odor like chloroform	MW: 131 BP: 186°F Sol: 0.1% Fl.P: None IP: 9.47 eV	VP: 58 mm MP: -123°F UEL: 41% LEL: 11%	Strong caustics; when acidic reacts with aluminum; chemically active metals; barium, lithium, sodium, magnesium, titanium Char; CS; GC; J
Trichloronaphthalene C ₁₀ H ₇ Cl ₃ 1321-65-9 QK4025000	Halowax, Seekay wax, Nibren wax	5 mg/m ³	20 mg/m ³	Colorless to pale yellow solid with an aromatic odor	MW: 231 BP: 580 to 670°F Sol: insoluble Fl.P(tc): 392°F	VP: < 1 mm MP: 199°F UEL: ? LEL: ?	Strong oxidizers Filter/bub. iso-octane, GC; I

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards					
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs		
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	ACGIH 25 mg/m ³ : SA/SCBA 62.5 mg/m ³ : SA/CF 125 mg/m ³ : SAF/SCBAF 1300 mg/m ³ : SAF/PD,PP Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Con ing	Eyes, resp, skin irrit; head; nau	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Resp sys, skin, eyes	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH E: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs ing Con	Irrit nose, eyes; CNS depression; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	CNS, eyes, nose, liver, kidneys	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	NIOSH E: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh ing Con	Head, vertigo, vis dist, tremors, somnolence, nau, vomit, irrit eyes, derm; card arrhy; para; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Resp sys, heart, liver, kidneys, CNS, skin	
Clothing: AP molten fu/RP sol liq Goggles: AP molten/Rees sol liq Wash: Promptly upon contam Change: After work it may be contam sol Remove: Immed contam non-imperv molten/pro contam sol	OSHA 20 mg/m ³ : SAF/SCBAF Q: SCBAF/PD,PP/ SAF/PD,PP/ASCBA Escape: GMFHIEOV/SCBAE	Inh Abs ing Con	Acneform derm, anor, nau, vert, jaun, liver injury	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Skin, liver	

Trichloronaphthalene

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
1,2,3-Trichloropropane CH ₂ ClCHClCH ₂ Cl 98-18-4 TZ9275000	Allyl trichloride, Glyceroltrichlorohydrin, Glycerin trichlorohydrin, Trichlorohydrin	50 ppm (300 mg/m ³)	1000 ppm	Colorless liquid with a strong, acid odor	MW: 147 BP: 313°F Sol: Insoluble F.P: 164°F	VP: 3.4 mm MP: 5°F UEL: 12.6% LEL: 3.2%	Active metals, strong caustics and oxidizers Char: CS: GC: I
1,1,2-Trichloro-1,2,2-trifluoroethane CCl ₂ FCClF ₂ 78-13-1 KJ4000000 1078 12	Halocarbon 113, Refrigerant 113, TTE, Freon 113	1000 ppm (7600 mg/m ³)	4500 ppm	Colorless liquid with an odor like carbon tetrachloride (at high concentrations)	MW: 187 BP: 118°F Sol: 0.02% Not combustible IP: 11.99 eV	VP: 284 mm MP: -31°F	Chemically active metals: calcium, powdered aluminum, zinc, magnesium, beryllium; contact alloys >2% Mg decomposes Char: CS: GC: I
Triethylamine (C ₂ H ₅) ₃ N 121-44-8 YED175000 1298 68	None	25 ppm (100 mg/m ³) (ACGIH) 10 ppm (40 mg/m ³)	1000 ppm	Colorless liquid with a fishy odor	MW: 101 BP: 193°F Sol: 5.5% F.P(oc): 20°F IP: 7.5 eV	VP: 54 mm MP: -175°F UEL: 8% LEL: 1.2%	Strong oxidizers and acids Bub: H ₂ SO ₄ . GC: K
Trifluoromonobromomethane CBrF ₃ 75-63-8 PA5425000 1009 12	Halon 1301, Halocarbon 13B1, Refrigerant 13B1, Bromotrifluoromethane, Freon 13B1	1000 ppm (6100 mg/m ³)	50,000 ppm	Colorless gas with a slight, ethereal odor	MW: 148 BP: -72°F Sol: 0.03% Not combustible IP: 11.9 eV	MP: -270°F	Chemically active metals, calcium, powdered aluminum, zinc, magnesium Char: CH ₂ Cl ₂ . GC: I

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	OSHA 500 ppm: SA*/SCBA* 1000 ppm: SAF/SCBAF/SA:CF* G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, throat; CNS depres; liver injury; skin irrit	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Eyes, resp sys, skin, CNS, liver
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon wet Change: N.A. Remove: Promptly wet non-imperv	OSHA 4500 ppm: SA/SCBA G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit throat, drow, derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, heart
Clothing: Repeat prolong Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: >1% eyewash, quick drench	ACGIH 250 ppm: SA:CF* 500 ppm: SCBAF/SAF 1000 ppm: SAF:PD,PP G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Abs Con	Irrit eyes, resp sys, skin	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Resp sys, eyes, skin
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 10,000 ppm: SA/SCBA 25,000 ppm: SA:CF 50,000 ppm: SCBAF/SAF/SAT:CF G: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	LI-head, card arrhy	Breath: Art resp	Heart, CNS

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)	
Trinitrotoluene $\text{C}_7\text{H}_5\text{N}_3\text{O}_7$ 118-96-7 XU0175000 1356 33	TNT; Trinitrotoluol; 2,4,6-Trinitrotoluene; sym-Trinitrotoluene	1.5 mg/m ³ (ACGIH) 0.5 mg/m ³	N.A.	Colorless to pale yellow, odorless solid	MW: 227 BP: 464°F Sol: 0.013% Fl.P: Explodes	VP(185°F): 0.05 mm MP: 178°F	Strong oxidizers, ammonia, strong alkalis, oxidizable materials	—
Triorthocresyl phosphate $(\text{C}_6\text{H}_4\text{H}_3\text{O})_3\text{PO}$ 78-30-8 TD0350000 2574 55	o-Trityl phosphate, TCP, TOCP	0.1 mg/m ³	40 mg/m ³	Colorless, odorless liquid	MW: 368 BP: Decomposes Sol: 0.00003% Fl.P: 437°F	VP: ? MP: -27°F UEL: ? LEL: ?	None hazardous	Filter; ether; GC; P
Triphenyl phosphate $(\text{C}_6\text{H}_5\text{O})_3\text{PO}$ 115-86-6 TC8400000	Phenyl phosphate, TPP	3 mg/m ³	N.A.	Colorless solid with a faint, aromatic odor	MW: 326 BP: 698°F Sol: 0.001% Fl.P: 428°F	VP: ? MP: 119°F UEL: ? LEL: ?	None hazardous	Filter; ether; GC; P
Turpentine $\text{C}_{10}\text{H}_{16}$ 8006-64-2 Y08400000 1299 27	Gumspirits, Turps, Wood turpentine, Spirits of turpentine, Sulfate wood turpentine, Steam distilled turpentine, Gum turpentine	100 ppm (560 mg/m ³)	1900 ppm	Colorless liquid with a characteristic paint odor	MW: 136 BP: 302 to 358°F Sol: Insoluble Fl.P: 95°F	VP: 5 mm MP: -58 to -78°F UEL: ? LEL: 0.8%	Strong oxidizers, chlorine	Char; CS; GC; III

Personal Protection and Sanitation (See Table 2)		Respirator Selection Upper Limit Devices Recommended (See Table 3)		Health Hazards			
				Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam/ daily Change: After work it may be contam Remove: Promptly contam non- imperv	ACGIH 5.0 mg/m ³ : SA+SCBA* 12.5 mg/m ³ : SA,CF* 25 mg/m ³ : SAF/SCBAF 1000 mg/m ³ : SAF,PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: GMFHiEOV/SCBAE	Inh Abs Ing Con	Liver damage; jaun; cyan; sneez; cough; sore throat; peri neur, musc pain; kidney damage; card; cataract; dem; leucyt, anemia	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Blood, liver, eyes, CVS, CNS, kidneys, skin	
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non- imperv	OSHA 0.5 mg/m ³ : DMXS 1 mg/m ³ : DMXSQ/SA/SCBA 2.5 mg/m ³ : PAPRDM/SA,CF 5 mg/m ³ : HiEF/PAPRTHiE/SCBAF/ SAF/SAT,CF 40 mg/m ³ : SA,PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	GI; peripheral neuropathy; cramps in calves; pores in feet or hands; weak, bilat, foot or wrist drop, para	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Art resp Medical attention immed	PNS, CNS	
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 15 mg/m ³ : DXS 30 mg/m ³ : DXSQ/SA/SCBA/HiE 75 mg/m ³ : PAPRDM/SA,CF 150 mg/m ³ : HiEF/PAPRTHiE/SCBAF/ SAF/SAT,CF 1500 mg/m ³ : SA,PD,PP 3000 mg/m ³ : SAF,PD,PP Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: HiEF/SCBAE	Inh Ing	Minor changes in blood enzymes; in animals: musc weakness, paralysis	Breath: Swallow:	Art resp Medical attention immed	Blood	
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	OSHA 1000 ppm: CCRFOV/PAPROV* 1900 ppm: SA,CF-/GMFOV/ SAF/SCBAF Q: SCBAF,PD,PP/ SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, vertigo; hematuria, albuminuria; skin irrit, sens	Eye: Skin: Breath: Swallow:	Irr immed Soap wash promptly Art resp Medical attention immed	Skin, eyes, kidneys, resp sys	

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurements Method (See Tables 1a and 1b)
Uranium, insoluble compounds (as U) U 7440-61-1 YR3490000	Synonyms vary depending upon specific compound	0.25 mg/m ³ (ACGIH) 0.2 mg/m ³	30 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Uranium: CO ₂ , CCl ₄ , HNO ₃ , Uranium hydride; strong oxidizers; H ₂ O, halogenated hydrocarbons	—
9175 85							
Uranium, soluble compounds (as U) U 7440-61-1 YR3590000	Synonyms vary depending upon specific compound	0.05 mg/m ³ (ACGIH) 0.2 mg/m ³	20 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Uranyl nitrates: combustibles, Uranium hexafluoride: water	—
1314-62-1 YW2450000 2862 55							
Vanadium pentoxide dust (as V) V ₂ O ₅ 1314-62-1 YW2450000 2862 55	None	0.5 mg/m ³ ceiling (NIOSH) 0.05 mg/m ³ 15-min cell	70 mg/m ³	Yellow-orange powder or dark gray flakes, odorless	MW: 182 BP: 3182°F Sol: 0.1% Not combustible	VP: 40 mm MP: 1274°F	None hazardous Filter: NaOH, AA, Set 1
Vanadium pentoxide fume (as V) V ₂ O ₅ 1314-62-1 YW2460000 2862 55	None	0.1 mg/m ³ ceiling (NIOSH) 0.05 mg/m ³ 15-cell (ACGIH) 0.05 mg/m ³	70 mg/m ³	Finely divided particulate dispersed in air	MW: 182 BP: 3182°F Sol: 0.1% Not combustible	VP: 40 mm MP: 1274°F	None hazardous Filter: NaOH, AA, Set 2

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Any poss Wash: Promptly upon contam Change: After work it may be contam Remove: Promptly contam non-imperv Provide: Eyewash	ACGIH 2.0 mg/m ³ : DMFu ¹ /SA ¹ /SCBA ¹ 5 mg/m ³ : SA:CF ⁴ PAPRDMFu ¹ 10 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE ¹ 30 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con Ing	Derm	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Skin, bone marrow, lymphatics
Clothing: RPI/AP UF _s Goggles: Any poss Wash: Promptly contam/immed & daily UF _s Change: After work may contam/UF _s , AP Remove: Non-imperv promptly/immed UF _s Provide: Eyewash (UF _s), quick drench	See Appendix B	Inh Con Ing	Lac, conj; short breath, cough, chest rales; nau, vomit; skin burns; RBC, casts in urine, album, high BUN	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Medical attention immed	Resp sys, blood, liver, lymphatics, kidneys, skin, bone marrow
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	NIOSH 0.5 mg/m ³ : HIE/SA ¹ /SCBA ¹ 1.25 mg/m ³ : SA:CF ⁴ /PAPRTHIE ¹ 2.5 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE ¹ 70 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes; green tongue, metal taste; irrit throat; cough; fine rales, wheez, bron, dysp; eczema	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Resp sys, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 0.5 mg/m ³ : HIE/SA ¹ /SCBA ¹ 1.25 mg/m ³ : SA:CF ⁴ /PAPRTHIE ¹ 2.5 mg/m ³ : HIEF/SCBAF/SAF/PAPRTHIE ¹ 70 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, green tongue, metal taste, irrit throat, cough, fine rales, wheez, bron, dysp, eczema	Breath: Art resp	Resp sys, skin, eyes

Vanadium pentoxide Fume

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Vinyl chloride C ₂ H ₃ Cl 75-01-4 KU9625000 1086 17	Chloroethylene, Chloroethene, Monochloroethylene, Ethylene monochloride, Monochloroethene, Vinyl C monomer, Trovidur, VC, Vinyl chloride monomer, VCM	1 ppm 5 ppm 15-min ceil (NIOSH) Lowest detectable limit See Appendix A (ACGIH) 5 ppm, A1a	Ca	Colorless gas; liquifies in a freezing mixture	MW: 62.5 BP: 7°F Sol: Slight F.L.P.: -108°F IP: 9.995 eV	VP: 2580 mm MP: -245°F UEL: 33 LEL: 3.6	Copper oxidizing materials NIOSH 77-157A
Vinyltoluene CH ₂ C ₆ H ₄ CHCH ₃ 25013-15-4 WL5075000 2618 27	Methylstyrene, Polyethylene; meta- and para-vinyltoluene (mixed isomers)	100 ppm (480 mg/m ³) (ACGIH) 50 ppm (240 mg/m ³)	5000 ppm	Colorless liquid with a strong, disagreeable odor	MW: 118 BP: 334°F Sol: 0.009% F.L.P.: 127°F	VP: 1.1 mm MP: -106°F UEL: 11% LEL: 0.1%	Oxidizing agents, catalysts for vinyl polymerization, such as peroxides, strong acids, aluminum chloride Char. CS; CG; III
Warfarin C ₁₉ H ₁₄ O ₄ 81-81-2 GN4550000 3027 55	3-(alpha-Acetyl)benzyl-4-hydroxycoumarin, WARF compound, compound 42, coumarin	0.1 mg/m ³	200 mg/m ³	Colorless, odorless solid	MW: 308 BP: Decomposes Sol: Insoluble F.L.P.: N.A.	VP: ? MP: 322°F UEL: ? LEL: ?	Strong oxidizers Filter; CH ₃ OH; HPLC; III
Xylene (o-, m-, and p-isomers) C ₆ H ₄ (CH ₃) ₂ 1330-20-7 ZE2100000 1307 27	p-ortho-Xylene, 1,2-Dimethyl-benzene; meta-Xylene, 1,3-Dimethyl-benzene; para-Xylene, 1,4-Dimethyl-benzene	100 ppm (435 mg/m ³) (NIOSH) 100 ppm 10-hr TWA 200 ppm 10-min ceil	1000 ppm	Colorless liquid with aromatic odors (pure p-xylene is a solid at < 55°F)	MW: 106 BP: 292/282/ 281°F Sol: 0.00003% F.L.P.: 90/84/ 81°F IP: 8.56/8.56/ 8.44 eV	VP: 7/9/9 MP: -12/-54/ 55°F UEL: 6/7/7% LEL: 1/1.1/ 1.1%	Strong oxidizers Char. CS; GC; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam immed Provide: Eyewash, quick drench	NIOSH E: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFV/SCBAE	Inh	Weak, abdom pain, GI bleeding, hematomegaly, pal or cyan of extrem, (arc)	Breath: Art resp	Liver, CNS, blood, resp sys, lymphatic sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	ACGIH 500 ppm: CCROV*/SA*/SCBA* 1000 ppm: PAPROV*/ICRFOV 1250 ppm: SA:CF* 2500 ppm: GMFOV/SCBAF/SAF 5000 ppm: SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con Ing	Irrit eyes, skin, upper resp; drow	Eye: Irr immed Skin: Soap flush promptly Breath: Art resp Swallow: Medical attention immed	Eyes, skin, resp sys
Clothing: Repeat prolong Goggles: N.A. Wash: Promptly upon contam Change: After work any poss contam Remove: Promptly contam non-imperv	OSHA 0.5 mg/m ³ : DMXS 1 mg/m ³ : OMXSQ/SA/SCBA 2.5 mg/m ³ : PAPRDW/SA:CF 5 mg/m ³ : HIEF/ PAPRTHIE/SCBAF/SAF/SAT:CF 100 mg/m ³ : SA:PD,PP 200 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Hema, back pain, hemats arms, legs; apistaxis, bleeding lips, muc memb hemorr, abdom pain, vomit, fecal blood; petechial rash; abnormal hematology	Eye: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	Blood, CVS
Clothing: Repeat prolong Goggles: Reas prob Wash: Promptly upon contam Change: N.A. Remove: Any wet immed (flamm)	NIOSH 1000 ppm: CCROV*/PAPROV*/SA*/SCBA* Q: 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: Irr immed Skin: Soap wash promptly Breath: Art resp Swallow: Medical attention immed	CNS, eyes, GI tract, blood, liver, kidneys, skin

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Xylidine (CH ₃) ₂ C ₈ H ₉ NH ₂ 1300-73-8 ZE8575000 1711 55	2,4-Dimethylaniline, etc (8 isomers); Xylidine isomers; Xylidine mixed o-m-p	5 ppm (25 mg/m ³) (ACGIH) 2 ppm (10 mg/m ³)	150 ppm	Pale yellow to brown liquid with a weak, aromatic, amine odor	MW: 121 BP: 415 to 439°F Sol: Insoluble F.P.: 206°F	VP: < 1 mm MP: ? UEL: ? LEL: 1.5%	Strong oxidizers, hypochlorite bleaches SiO ₂ ; CH ₃ CH ₂ OH; GC; L
Yttrium compounds (as Y) Y 7440-85-5 ZG2980000	Synonyms vary depending upon specific compound	1 mg/m ³	N.A.	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	Yttrium nitrate; combustible materials	Filter; acid; AA; N
Zinc Chloride fume ZnCl ₂ 7648-85-7 ZH1400000 2331 60	None	1 mg/m ³	2000 mg/m ³	White fume with an acrid odor	MW: 136 BP: 1350°F Sol(77°F): 81% Not combustible	VP: N.A. MP: 541°F	None hazardous —
Zinc oxide fume ZnO 1314-13-2 ZH4810000 1436 32	Calamine	5 mg/m ³ (NIOSH) 5 mg/m ³ 10-hr TWA 15 mg/m ³ 15-min cell	N.A.	White fume	MW: 81 BP: Sublimes Sol: Insoluble Not combustible	VP: N.A. MP: <3272°F	Chlorinated rubber Filter; (none); XRD; III

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Immed contam non-imperv Provide: Eyewash, quick drench	ACGIH 20 ppm: CCROV/SA/SCBA 50 ppm: SA:CF/PAPROV 100 ppm: CCRFOV/PAPRTOV/ GMFOV/SAF/SCBAF 150 ppm: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia, cyan; lung, liver, kidney damage	Eye: Irr Immed Skin: Soap wash immed Breath: Art resp Swallow: Medical attention immed	Blood, lungs, liver, kidneys, CVS
Clothing: N.A. Goggles: Any poss Wash: N.A. Change: N.A. Remove: N.A. Provide: Eyewash	OSHA 5 mg/m ³ : DMXS 10 mg/m ³ : DMXSQ/SA/SCBA 25 mg/m ³ : PAPRDM/SA:CF 50 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 500 mg/m ³ : SA:PD,PP 1000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes; in animals: lungs, possible liver damage	Eye: Irr Immed Skin: Soap wash Breath: Art resp Swallow: Medical attention immed	Eyes, lungs
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	OSHA 10 mg/m ³ : DMFu/SA/SCBA* 25 mg/m ³ : PAPRDMFu/SA:CF* 50 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF 2000 mg/m ³ : SAF:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Conj; Irrit nose, throat; cough, copious sputum, dysp, chest pain, pulm edema, bron pneu; pulm fib, cor pulmonale; hr; cyan, tachypnea; burns skin, eyes	Breath: Art resp	Resp sys, skin, eyes
Clothing: N.A. Goggles: N.A. Wash: N.A. Change: N.A. Remove: N.A.	NIOSH 50 mg/m ³ : DMFu/SA/SCBA 125 mg/m ³ : PAPRHDMFu/SA:CF 250 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT:CF 2500 mg/m ³ : SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Sweet metal taste; dry throat, cough; chill, fever; tight chest, dysp, rales, lo pulm func; head; blur vision; back pain; nau, vomit; fig	Breath: Art resp	Resp sys

Zinc oxide fume

Chemical Name, Formula, CAS, RTECS, and DOT UN or NA and Guide Numbers	Synonyms	Exposure Limits	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method (See Tables 1a and 1b)
Zirconium compounds (as Zr) Zr 7440-67-7 ZH7070000	Synonyms vary depending upon specific compounds	5 mg/m ³	500 mg/m ³	Appearance and odor vary depending upon specific compound	Properties vary depending upon specific compound	ZrCl: water, moist air, alkali metals; ZrH: strong oxidizers	Filter; acid; AA; M
*Dibromochloropropane C ₃ H ₅ BrCl 98-12-8 TX8750000 2872	1-Chloro-2,3-dibromopropane, DBCP, 1,2-Dibromo-3-chloropropane	1 ppb (NIOSH) 10 ppb (0.1 mg/m ³) 10-hr TWA	Ca	Dense yellow or amber liquid with a pungent odor at high concentrations. May also appear in granular form	MW: 236 BP: 383°F Sol: 0.1% FLP: 170°F(oc)	VP: 0.8 mm MP: 43°F UEL: ? LEL: ?	Chemically active metals: aluminum, magnesium, tin and alloys; attacks some rubber and coatings

Personal Protection and Sanitation (See Table 2)	Respirator Selection Upper Limit Devices Recommended (See Table 3)	Health Hazards			
		Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Recommendations vary depending upon specific compounds	OSHA 25 mg/m ³ : DMXS 50 mg/m ³ : DMXSQ/SA/SCBA 125 mg/m ³ : PAPRDM/SA-CF 250 mg/m ³ : HIEF/PAPRTHIE/ SCBAF/SAF/SAT-CF 500 mg/m ³ : SA-PD,PP Q: SCBAF-PD,PP/ SAF-PD,PP-ASCBA Escape: HIEF/SCBAE	Inh Con	Skin granulomas	Eye: Skin: Breath: Swallow: Irr immed Soap wash Art resp Medical attention immed	Resp sys, skin
*Clothing: Any poss Goggles: Any poss Wash: Immed upon contam/daily Change: After work if any poss contam Remove: Any contam Immed	NIOSH E: SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFHEOV/SCBAE	Inh Abs Con	Drow, nau, vomit; Irrit eyes, nose, throat, skin; pulm edema, [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Art resp Medical attention immed	CNS, skin, liver, kidney, spleen, reproductive sys, digestive sys

Dibromochloropropane

APPENDICES

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, in part, states:

“ ‘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. To ensure maximal protection through the use of respiratory protection, only the most reliable and protective respirators are recommended. These include: a self-contained breathing apparatus with a full facepiece operated in positive-pressure mode, or a supplied-air respirator with a full facepiece operated in 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.

APPENDIX B—SUPPLEMENTARY RESPIRATOR SELECTION TABLES

Carbon black	<p>NIOSH 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 3500 mg/m³: SA:PD,PP Q: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE</p>	<p>0.25 mg/m³: SA^a/SCBA^a/DMXSQ^a 0.625 mg/m³: PAPRTHIE^a/SA:CF^a 1.25 mg/m³: HIEF/PAPRTHIE^a/ SCBAF/SAF 25 mg/m³: SA:PD,PP 50 mg/m³: SAF:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE</p>
	<p>IN PRESENCE OF POLYCYCLIC AROMATIC HYDROCARBONS</p>	<p>Mercury and Inorganic com- pounds (as Hg)</p>
	<p>NIOSH E: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE</p>	<p>Inorganic Mercury Compounds with essentially no vapor pressure</p>
Chromic acid and chromates (as CrO₃)	<p>CARCINOGENIC Cr (VI) NIOSH E: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE</p>	<p>NIOSH 0.5 mg/m³: HiE/SA/SCBA 1.25 mg/m³: SA:CF/PAPRTHIE 2.5 mg/m³: SAF/SCBAF/HIEF/ PAPRTHIE/SAT:CF 28 mg/m³: SA:PD,PP Q: SCBAF:PD,PP/ SAF:PD,PP:ASCBA Escape: HIEF/SCBAE</p>
	<p>NONCARCINOGENIC Cr (VI)</p>	

APPENDIX B—SUPPLEMENTARY RESPIRATOR SELECTION TABLES (Continued)

**Mercury
(elemental)**

NIOSH
 0.5 mg/m³: CCRS®/SA/SCBA
 1.25 mg/m³: SA:CF/PAPRS® (canister)
 PAPRS® (canister)
 2.5 mg/m³: SAF/SCBAF/SAT:CF
 CCRFS®/GMFS®/PAPRTS (canister)
 28 mg/m³: SA:PD,PP
 Ω: SCBAF:PD,PP/
 SAF:PD,PP:ASCBA
 Escape: GMFS/SCBAE

**Uranium, soluble
compounds
(as U)**

Halides
 OSHA
 0.5 mg/m³: CCRAHIE/SA/SCBA
 1.25 mg/m³: SA:CF/PAPRHIEAG
 2.5 mg/m³: SAF/SCBAF/SAT:CF
 CCRAGFHIE/GMFHIEAG/
 PAPRTHIEAG
 20 mg/m³: SAF:PD,PP
 Ω: SCBAF:PD,PP/SAF:PD,PP:ASCBA
 Escape: GMFHIEAG/SCBAE

Non-halides

OSHA
 0.5 mg/m³: HiE/SA/SCBA
 1.25 mg/m³: SA:CF/PAPRHIE
 2.5 mg/m³: SAF/SCBAF/HiEF/
 PAPRTHIE/SAT:CF
 20 mg/m³: SAF:PD,PP
 Ω: SCBAF:PD,PP/SAF:PD,PP:ASCBA
 Escape: HiEF/SCBAE

APPENDIX C—THIRTEEN OSHA REGULATED CARCINOGENS

OSHA has promulgated standards to regulate the industrial use of thirteen chemicals (2-acetylaminofluorene, alpha-naphthylamine, 4-aminodiphenyl, benzidine, beta-naphthylamine, beta-propiolactone, bis-chloromethyl ether, 3,3-dichlorobenzidine, 4-dimethylaminoazobenzene, ethyleneimine, methyl chloromethyl ether, n-nitrosodimethylamine, and 4-nitrobiphenyl) identified as occupational carcinogens without establishing permissible exposure limits. Workers' exposure to these thirteen chemicals are to be controlled through the required use of engineering controls, work practices, and personal protective equipment, including respirators. Details of these requirements can be found in 29 CFR 1910.1003-1910.1016.

Respirator selections are based on NIOSH policy which considers the thirteen chemicals to be potential human carcinogens in the workplace.

APPENDIX D—SUPPLEMENTARY EXPOSURE LIMITS

Asbestos

The effective date for the current OSHA standard for asbestos was July 21, 1986. The 8-hour TWA airborne concentration of asbestos fibers to which any worker may be exposed shall not exceed 0.2 fiber, longer than 5 micrometers with a length-to-diameter ratio of at least 3 to 1, per cubic centimeter of air (0.2 fiber/cc), as determined by the membrane filter method at approximately 400 X magnification with phase contrast illumination. An "action level" of 0.1 fiber/cc as an 8-hour TWA was established as the level above which employers must initiate compliance activities, such as worker training and medical surveillance.

NIOSH considers asbestos a carcinogen (Ca); the NIOSH-recommended 8-hour TWA exposure limit for asbestos fibers >5 micrometers in length is 100,000 fibers/m³ (0.1 fiber/cc), utilizing a 400-liter air sample, and the NIOSH Analytical Method 7400.

ACGIH designates asbestos as a human carcinogen (A1a) with an assigned TLV for: amosite, 0.5 fiber > 5 $\mu\text{m}/\text{cc}$; chrysotile, 2 fibers > 5 $\mu\text{m}/\text{cc}$; crocidolite, 0.2 fiber > 5 $\mu\text{m}/\text{cc}$; and other forms, 2 fibers > 5 $\mu\text{m}/\text{cc}$; as determined by the membrane filter method at 400-450X magnification (4-mm objective) with phase contrast illumination.

APPENDIX D—SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Chromic Acid and Chromates (as CrO₃)

Chromium: Soluble Chromic and Chromous Salts (as Cr)

Chromium Metal and Insoluble Salts (as Cr)

The OSHA PEL for chromic acid and chromates is 0.1 mg CrO₃/m³ (ceiling); for soluble chromic and chromous salts, 0.5 mg Cr/m³ (8-hour TWA); and for chromium metal and insoluble salts, 1 mg Cr/m³ (8-hour TWA).

The NIOSH REL (10-hour TWA) for carcinogenic hexavalent chromium [Cr(VI)] compounds is 1 µg Cr(VI)/m³; for noncarcinogenic Cr(VI) compounds (which include chromic acid), the REL is 25 µg Cr(VI)/m³ (10-hour TWA) and 50 µg Cr(VI)/m³ (15 minute ceiling). Based on current evidence, noncarcinogenic Cr(VI) compounds are the monochromates and dichromates (dichromates) of hydrogen, lithium, sodium, potassium, rubidium, cesium, and ammonia, and chromium (VI) oxide (chromic acid anhydride). Carcinogenic Cr(VI) compounds comprise any and all Cr(VI) materials not included in the noncarcinogenic group above.

ACGIH has various TLVs for chromium compounds. The 8-hour TWA is 0.5 mg Cr/m³ for chromium metal; chromium (II) compounds (e.g., chromous chloride and chromous sulfate); and 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(VI)/m³ with a designation A1a (human carcinogen) for certain water-insoluble Cr(VI) compounds, which include zinc chromate, calcium chromate, lead chromate, barium chromate, strontium chromate, and sintered chromium trioxide.

APPENDIX D—SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Coal Tar Pitch Volatiles

The current OSHA PEL for coal tar pitch volatiles (anthracene, BaP, phenanthrene, acridine, chrysene, pyrene) is 0.2 mg/m³ benzene-soluble fraction (8-hour TWA).

NIOSH considers coal tar products to be carcinogenic (Ca); the NIOSH-recommended 10-hour TWA exposure limit for coal tar products is 0.1 mg/m³ (cyclohexane-extractable fraction).

ACGIH designates coal tar pitch volatiles as a human carcinogen (A1a) with an 8-hour TWA of 0.2 mg/m³ (benzene-solubles).

Cotton Dust (raw)

The current Federal standard for cotton dust was promulgated by OSHA on June 23, 1978 and is 200 µg/m³ (mean concentration) in textile yarn manufacturing, 750 µg/m³ (mean concentration) in textile slashing and weaving operations, and 500 µg/m³ (mean concentration) in all other operations. This standard does not apply to the harvesting of cotton, cotton ginning, and the handling and processing of woven or knitted materials and washed cotton. These concentrations are for samples averaged over an 8-hour period collected by the vertical elutriator or equivalent method.

The NIOSH-recommended exposure limit for cotton dust is less than 200 µg/m³ (lint-free cotton dust).

The ACGIH TLV for cotton dust (raw) is 200 µg/m³ (lint-free dust) as measured by the vertical elutriator cotton-dust sampler (8-hour TWA).

