NIOSH

Recommendations for Occupational Safety and Health

Compendium of Policy Documents and Statements

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

CDC
CENTERS FOR DISEASE CONTROL

NIOSH RECOMMENDATIONS FOR OCCUPATIONAL SAFETY AND HEALTH

Compendium of Policy Documents and Statements

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health
Division of Standards Development and Technology Transfer
Cincinnati, Ohio

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DEFINITIONS OF ABBREVIATIONS AND TERMS

ATSDR	Agency for Toxic Substances and Disease Registry
Ca	agent recommended by NIOSH to be treated as a potential occupational carcinogen
CAS	Chemical Abstracts Service
CDC	Centers for Disease Control
Ceiling	The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assessed as a 15-min TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.
CFR	Code of Federal Regulations
CIB	Current Intelligence Bulletin
CNS	central nervous system
CPSC	Consumer Product Safety Commission
dBA	decibels measured on the A scale (which approximates the response of the human ear)
DHEW	U.S. Department of Health, Education, and Welfare
DHHS	U.S. Department of Health and Human Services
EPA	U.S. Environmental Protection Agency
fibers/cc	fibers of contaminant per cubic centimeter of air
J/cm^2	joules per square centimeter
LOQ	limit of quantitation
μg	microgram
μm	micrometer
mg/m^3	milligrams of contaminant per cubic meter of air

mppcf	millions of particles per cubic foot of air
MSHA	Mine Safety and Health Administration
mW/cm^2	milliwatts per square centimeter
NEG	Nordic Expert Group for Documentation of Occupational Exposure Limits
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIEHS	National Institute of Environmental Health Sciences
NIOSH	National Institute for Occupational Safety and Health
NIOH	National Institute of Occupational Health (Sweden)
nm	nanometer
No.	number
NTIS	National Technical Information Service
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
PEL	permissible exposure limit (OSHA)
ppb	parts of contaminant per billion parts of air at 25°C and 1 atmosphere of pressure
ppm	parts of contaminant per million parts of air at 25°C and 1 atmosphere of pressure
REL	Recommended exposure limit. RELs are occupational exposure limits recommended by NIOSH as being protective of worker health and safety over a working lifetime. The REL is used in combination with engineering and work practice controls, exposure and medical monitoring, labeling, posting, worker training, and personal protective equipment. This limit is frequently expressed as a time-weighted average (TWA) exposure for up to 10 hr/day during a 40-hr workweek. The REL may also be expressed as (1) a short-term exposure limit (STEL) that should never be exceeded and is to be determined in a specified sampling time (usually 15 min), or (2) a ceiling limit that should never be exceeded even instantaneously unless specified over a given time period.
RTECS	Registry of Toxic Effects of Chemical Substances
Skin	The notation "skin" indicates that airborne or direct exposure by the cutaneous route (including mucous membranes and eyes) contributes to overall exposure.
STEL	Short-term exposure limit. Unless otherwise noted, the STEL is the 15-min TWA exposure that shall not be exceeded at any time during a workday.

TWA	Time-weighted average. Unless otherwise noted, TWA concentrations of a contaminant are for up to a 10-hr workday during a 40-hr workweek.
WL	working level
WLM	working level month

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INTRODUCTION

PURPOSE

This document was developed to provide a comprehensive list of National Institute for Occupational Safety and Health (NIOSH) documents that contain recommendations for safety and health standards in the workplace. Our intention is to make this information conveniently available to workers, employers, occupational health professionals, and union representatives.

BACKGROUND

Under the authority of the Occupational Safety and Health (OSH) Act [29 USC 1900] and the Mine Safety and Health Act [30 USC 80], NIOSH develops and recommends criteria for preventing disease and hazardous conditions in the workplace. NIOSH recommended exposure limits (RELs) are examples of such criteria. NIOSH also recommends preventive measures (e.g., engineering controls, safe work practices, personal protective equipment, and environmental and medical monitoring) for reducing or eliminating the adverse health effects of these hazards. To formulate these recommendations, NIOSH evaluates all relevant scientific information about a given hazard. The recommendations are then transmitted to the Occupational Safety and Health Administration (OSHA) and the Mine Safety and Health Administration (MSHA) of the U.S. Department of Labor for use in promulgating legal standards. These recommendations are generally published in criteria documents, Current Intelligence Bulletins (CIBs), Alerts, Special Hazard Reviews, Occupational Hazard Assessments, and responses to regulatory agencies (see page 2 for a description of these documents).

SCOPE

This document contains two major sections, A and B. Section A lists all NIOSH documents containing recommendations for chemical, physical, and other hazards in the workplace. Section B contains the NIOSH RELs for all of these hazards as well as the adverse health effects for the chemical and physical hazards. Five appendices contain additional information about (1) classes of chemicals and (2) RELs adopted or revised during OSHA rulemaking activity in 1988.*

Section A. Documents Containing NIOSH Recommendations for Safety and Health

This section lists all NIOSH documents that contain recommendations for safety and health standards in the workplace. These documents are listed by publication date under the occupational hazard they discuss. Each occupational hazard is arranged alphabetically. The types of documents included are as follows:

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*This activity is referred to hereafter as the OSHA PEL Project. The final rule was published in the *Federal Register* on January 19, 1989 [54 FR 2329–2984 (1989)].

- ***NIOSH publications*** (criteria documents, CIBs, Alerts, Special Hazard Reviews, Occupational Hazard Assessments, and miscellaneous statements and reports)

- ***Written testimony*** from NIOSH about rules proposed by regulatory agencies such as OSHA, MSHA, or the U.S. Environmental Protection Agency (EPA)

- ***Testimony presented by NIOSH*** at regulatory hearings convened by OSHA or MSHA

These documents are described here briefly and are available through NIOSH or the National Technical Information Service (NTIS).*

Criteria Documents. —Criteria documents are developed to provide the basis for the comprehensive occupational safety and health standards sought by congress. These documents generally contain a critical review of the scientific and technical information available on the prevalence of hazards, the existence of safety and health risks, and the adequacy of methods to identify and control hazards. Recommendations for minimizing safety and health risks include medical monitoring, exposure assessment, worker training, control technology, personal protective equipment, and recordkeeping as well as RELs where appropriate. Criteria documents are developed primarily for the U.S. Department of Labor (OSHA and MSHA); however, they are also distributed to health professionals in academia, industry, organized labor, public interest groups, and other Federal, State, and local government agencies.

Current Intelligence Bulletins (CIBs). —CIBs review and evaluate new and emerging information about occupational hazards. A CIB may draw attention to a previously unrecognized hazard, report new data on a known hazard, or disseminate information about hazard control. These documents are distributed to representatives of academia, industry, organized labor, public health agencies, and public interest groups as well as to Federal agencies responsible for ensuring the safety and health of workers.

Alerts. —NIOSH Alerts briefly present new information about occupational illnesses, injuries, and deaths. Alerts urgently request assistance in preventing, solving, and controlling newly identified occupational hazards. Workers, employers, and safety and health professionals are asked to take immediate action to reduce risks and implement controls.

Special Hazard Reviews, Occupational Hazard Assessments, and Miscellaneous Statements and Reports. —Special Hazard Reviews, Occupational Hazard Assessments, and miscellaneous statements and reports are other types of NIOSH documents that complement NIOSH recommendations for standards. These documents assess safety and health problems and recommend appropriate methods for control and monitoring. Although these documents do not supplant the more comprehensive criteria documents, they are prepared to assist OSHA or MSHA in the formulation of regulations.

Responses to Regulatory Agencies. —NIOSH periodically presents written comments and testimony before Congressional committees and at regulatory hearings convened by OSHA or MSHA. The testimony always includes the current NIOSH policy concerning the hazard in question.

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*National Technical Information Service, Port Royal Road, Springfield, VA 22161.
Order desk telephone: (703) 487–4650.

Section B. NIOSH RELs and General Recommendations for Safety and Health

This section contains three tables listing occupational hazards and the NIOSH RELs and general recommendations for safety and health. Table 1 lists chemical hazards, Table 2 presents physical hazards, and Table 3 contains industry, process, and work environment hazards. Health effects cited in Tables 1 and 2 are those generally associated with the hazard; they are for humans unless otherwise noted. Consult the primary sources listed in Section A for definitive information. The Chemical Abstracts Service (CAS) number and the Registry of Toxic Effects of Chemical Substances (RTECS) number are included in Table 1 where appropriate.

Appendix I. Classes of Chemicals

Several RELs apply to entire classes of chemicals. Appendix I lists these classes (e.g., alkanes, ketones, etc.) and the individual members of each that are listed by RTECS. Table 1 of Section B refers the reader to Appendix I whenever a class name is mentioned. Readers may use the class name to locate source documents in Section A.

Appendix II. Chemicals for Which NIOSH Adopted RELs During the OSHA PEL Project

Appendix II lists chemicals for which NIOSH adopted exposure limits on the basis of their comments during the OSHA PEL Project. These RELs are included in Table 1 of Section B. For further information about these chemicals, readers should refer to OSHA's final rule on air contaminants in the *Federal Register* [54 FR 2641 (1989)] and to the 1988 NIOSH testimony on OSHA's proposed rule on air contaminants [NTIS No. PB-91-115-337].

Appendix III. Chemicals for Which NIOSH Did Not Adopt RELs During the OSHA PEL Project

Appendix III lists chemicals for which NIOSH did not adopt RELs during the OSHA PEL Project. After a limited review of these chemicals, NIOSH concluded that adverse health effects could occur at the proposed OSHA PELs.

Appendix IV. Chemicals for Which NIOSH Revised Existing RELs During the OSHA PEL Project

Appendix IV lists chemicals for which NIOSH revised existing RELs during the OSHA PEL Project. These chemicals are listed with their previous and current RELs.

Appendix V. Categories of Pesticides

Appendix V lists pesticides according to three categories of toxicity defined in the 1978 NIOSH criteria document on pesticides (*Criteria for a Recommended Standard: Occupational Exposure During the Manufacturing and Formulation of Pesticides*, DHEW (NIOSH) Publication No. 78-174, NTIS No. PB-81-227-001). Many of the chemicals listed as pesticides have other applications and are presented in Sections A and B.

SECTION A

DOCUMENTS CONTAINING NIOSH RECOMMENDATIONS FOR SAFETY AND HEALTH

This section lists all NIOSH documents that contain recommendations for safety and health standards in the workplace. These documents are listed by publication date under the occupational hazard they discuss. Each occupational hazard is arranged alphabetically.

2-Acetylaminofluorene

1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Acetylene

1976. Criteria for a Recommended Standard: Occupational Exposure to Acetylene. DHEW (NIOSH) Publication No. 76-195, NTIS No. PB-267-068.

Acrylamide

1991. NIOH and NIOSH basis for an occupational standard: Acrylamide: a review of the literature. DHHS (NIOSH) Publication No. 91-115.

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Acrylamide. DHEW (NIOSH) Publication No. 77-112, NTIS No. PB-273-871.

Acrylonitrile

1978. Public Hearing on Occupational Exposure to Acrylonitrile, March 1978. NTIS No. PB-87-222-865.

1978. Criteria for a Recommended Standard: Occupational Exposure to Acrylonitrile. DHEW (NIOSH) Publication No. 78-116, NTIS No. PB-81-225-617.

1977. Current Intelligence Bulletin 18: Acrylonitrile. In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-81-225-617.

Air contaminants (MSHA)

1990. Comments on MSHA's Proposed Rule on Air Quality, Chemical Substances, and Respiratory Protection Standards, March 1, 1990. NTIS No. PB-91-173-997.

Air contaminants (OSHA)

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

Aldehydes

1991. Current Intelligence Bulletin 55: Carcinogenicity of Acetaldehyde and Malonaldehyde, and Mutagenicity of Related Low-Molecular-Weight Aldehydes. DHHS (NIOSH) Publication No. 91-112, NTIS No. PB-92-131-697.

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

Aldrin/dieldrin

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Special Occupational Hazard Review for Aldrin/Dieldrin. DHEW (NIOSH) Publication No. 78-201, NTIS No. PB-297-769.

Alkanes

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Alkanes. DHEW (NIOSH) Publication No. 77-151, NTIS No. PB-273-817.

Allyl chloride

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Allyl Chloride. DHEW (NIOSH) Publication No. 76-204, NTIS No. PB-267-071.

4-Aminodiphenyl

1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Ammonia

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1974. Criteria for a Recommended Standard: Occupational Exposure to Ammonia. DHEW (NIOSH) Publication No. 74-136, NTIS No. PB-246-699.

Aniline

1990. NIOSH Alert: Request for Assistance in Preventing Bladder Cancer from Exposure to o-Toluidine and Aniline. DHHS (NIOSH) Publication No. 90-116, NTIS No. PB-91-188-953.

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

Animal waste pits

1990. NIOSH Alert: Request for Assistance in Preventing Deaths of Farm Workers in Manure Pits. DHHS (NIOSH) Publication No. 90-103, NTIS No. PB-90-242-033.

Antimony

1978. Criteria for a Recommended Standard: Occupational Exposure to Antimony. DHEW (NIOSH) Publication No. 78-216, NTIS No. PB-81-226-060.

Arsenic, inorganic

1982. Testimony to the Department of Labor: Comments at the OSHA Arsenic Hearing, July 14, 1982. NTIS No. PB-87-222-659.

1976. Current Intelligence Bulletin 14: Inorganic Arsenic; Respiratory Protection. In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

1976. Testimony to the Department of Labor: Proposed Standard for Occupational Exposure to Inorganic Arsenic, September 8, 1976. NTIS No. PB-90-130-071.

1975. Criteria for a Recommended Standard: Occupational Exposure to Inorganic Arsenic (revised). DHEW (NIOSH) Publication No. 75-149, NTIS No. PB-246-701.

1975. Testimony to the Department of Labor: Statement on Proposed Standard for Occupational Exposure to Inorganic Arsenic, April 8, 1975. NTIS No. PB-91-118-984.

1974. Criteria for a Recommended Standard: Occupational Exposure to Inorganic Arsenic. DHEW (NIOSH) Publication No. 74-110, NTIS No. PB-228-151.

Arsine

1979. Current Intelligence Bulletin 32: Arsine (Arsenic Hydride) Poisoning in the Workplace. DHEW (NIOSH) Publication No. 79-142, NTIS No. PB-85-119-139.

1975. Criteria for a Recommended Standard: Occupational Exposure to Inorganic Arsenic (revised). DHEW (NIOSH) Publication No. 75-149, NTIS No. PB-246-701.

Art materials (CPSC)

1991. Comments on the Consumer Product Safety Commission's Proposed Rule on Labeling Requirements for Art Materials and Other Products, October 1, 1991. NTIS No. PB-92-139-013.

Asbestos (EPA)

1989. Comments on EPA's Proposed Rule Revision on Asbestos; NESHAP Revision, March 6, 1989. NTIS No. PB-90-129-404.

1987. Comments on EPA's Proposed Rule on Asbestos-Containing Materials in Schools, June 29, 1987. NTIS No. PB-91-169-003.

1985. Comments to the Environmental Protection Agency: EPA Proposed Rule; Asbestos Abatement Projects, August 1985. NTIS No. PB-91-152-777.

Asbestos (OSHA)

1991. Post-Hearing Comments on OSHA's Proposed Rule on Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite, April 26, 1991. NTIS No. PB-92-136-043.

1991. Testimony on OSHA's Proposed Rule on Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite, January 24, 1991. NTIS No. PB-92-139-088.

1990. Post-Hearing Comments on OSHA's Notice of Proposed Rulemaking on Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite, December 14, 1990. NTIS No. PB-91-212-514.

1990. Testimony on OSHA's Notice of Proposed Rulemaking on Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite, May 9, 1990. NTIS No. PB-91-152-439.

1990. Congressional Testimony before the Subcommittee on Toxic Substances; Environmental Oversight, Research and Development Committee on Environmental and Public Works, U.S. House of Representatives, April 26, 1990. NTIS No. PB-91-132-852.

1990. Comments on OSHA's Notice of Proposed Rulemaking on Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite, April 9, 1990. NTIS No. PB-91-152-413.

1987. Comments to the Department of Labor Stating the NIOSH Position on the Newly Promulgated OSHA Standard, December 1, 1987. NTIS No. PB-90-129-370.

1986. Comments to the Department of Labor Stating the NIOSH Definition of Asbestos, July 17, 1986. NTIS No. PB-90-130-048.

1984. Testimony to the Department of Labor: Occupational Exposure to Asbestos, June 21, 1984. NTIS No. PB-87-222-642.

1984. Congressional Testimony: Subcommittee on Public Building and Grounds, Committee on Public Works and Grounds, Committee on Public Works and Transportation, U.S. House of Representatives, March 21, 1984. NTIS No. PB-90-179-128.

1980. NIOSH/OSHA Asbestos Work Group Recommendations: Workplace Exposure to Asbestos; Review and Recommendations. DHHS (NIOSH) Publication No. 81-103, NTIS No. PB-83-176-677.

1980. Congressional Testimony: Subcommittee on Coast Guard and Navigation, House Committee on Merchant Marine and Fisheries, February 12, 1980. NTIS No. PB-90-192-964.

1979. Congressional Testimony before the Subcommittee on Labor Standards, House Committee on Education and Labor, May 1, 1979. NTIS No. PB-90-130-063.

1976. Revised Recommended Asbestos Standard. DHEW (NIOSH) Publication No. 77-169, NTIS No. PB-273-965.

1975. Current Intelligence Bulletin 5: Asbestos. In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080 .

1972. Criteria for a Recommended Standard: Occupational Exposure to Asbestos. DHEW (NIOSH) Publication No. HSM 72-10267, NTIS No. PB-209-510.

Asphalt fumes

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1982. Comments to OSHA on Coal Tar Pitch Volatiles Proposed Rule: Notice of Intention to Modify Interpretation, August 26, 1982. NTIS No. PB-90-193-723.

1977. Criteria for a Recommended Standard: Occupational Exposure to Asphalt Fumes. DHEW (NIOSH) Publication No. 78-106, NTIS No. PB-277-333.

Azides, explosive

1976. Current Intelligence Bulletin 13: Explosive Azide Hazard. In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

Benzene

1990. Comments to the Coast Guard: Notice of Proposed Rulemaking on Benzene, May 7, 1990. NTIS No. PB-91-152-058.

1986. Comments on OSHA's Proposed Rule: Occupational Exposure to Benzene, March 1986. NTIS No. PB-90-132-606.

1986. Testimony on OSHA's Proposed Rule: Occupational Exposure to Benzene. Presented at the OSHA Informal Public Hearing, March 20, 1986. NTIS No. PB-87-222-667.

1986. Post-Hearing Comments on OSHA's Proposed Rule: Occupational Exposure to Benzene, March 1986. NTIS No. PB-90-132-614.

1985. Comments to OSHA and EPA on Benzene, August 9, 1985. NTIS No. PB-90-153-776.

1977. Statement before the Department of Labor, Occupational Safety and Health Administration: Public Hearing on Occupational Standard for Benzene, July 25-26, 1977. NTIS No. PB-87-220-943.

1976. Revised Recommendation for an Occupational Exposure Standard for Benzene, August 1976. NTIS No. PB-83-196-196.

1974. Criteria for a Recommended Standard: Occupational Exposure to Benzene, July 1974. DHEW (NIOSH) Publication No. 74-137, NTIS No. PB-246-700.

Benzidine

1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Benzidine-based dyes

1983. Preventing Health Hazards from Exposure to Benzidine Congener Dyes, January 1983. DHHS (NIOSH) Publication No. 83-105, NTIS No. PB-83-195-305.

1980. OSHA/NIOSH Health Hazard Alert; Benzidine-, o-Tolidine- and o-Dianisidine-Based Dyes, December 1980. DHHS (NIOSH) Publication No. 81-106, NTIS No. PB-87-148-219.

1980. Special Occupational Hazard Review for Benzidine-Based Dyes, January 1980. DHEW (NIOSH) Publication No. 80-109, NTIS No. PB-81-225-633.

1978. Current Intelligence Bulletin 24: Direct Blue 6, Direct Black 38, Direct Brown 95, Benzidine Derived Dyes. DHEW (NIOSH) Publication No. 78-148, NTIS No. PB-85-119-220.

Benzoyl peroxide

1977. Criteria for a Recommended Standard: Occupational Exposure to Benzoyl Peroxide. DHEW (NIOSH) Publication No. 77-166, NTIS No. PB-273-819.

Benzyl chloride

1978. Criteria for a Recommended Standard: Occupational Exposure to Benzyl Chloride. DHEW (NIOSH) Publication No. 78-182, NTIS No. PB-81-226-698.

Beryllium

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Public Hearing on Occupational Standard for Beryllium, August 19, 1977. NTIS No. PB-83-182-378.

1975. Comments to OSHA: Updating the Criteria Document, December 10, 1975. NTIS No. PB-90-192-314.

1972. Criteria for a Recommended Standard: Occupational Exposure to Beryllium. DHEW (NIOSH) Publication No. 72-10268, NTIS No. PB-210-806.

Biotechnology

1989. Comments on EPA's Request for Comment on Regulatory Approach of Biotechnology, May 15, 1989. NTIS No. PB-90-162-421.

1989. Comments on EPA's Request for Comment on Regulatory Approach of Microbial Pesticides, May 15, 1989. NTIS No. PB-90-162-355.

1985. Comments on OSHA's Guidelines on Biotechnology, August 1985. NTIS No. PB-90-131-889.

Bloodborne diseases

1990. Post-Hearing Brief on OSHA's Proposed Rule on Occupational Exposure to Bloodborne Pathogens, May 21, 1990. NTIS No. PB-91-153-643.

1990. Post-Hearing Comments on OSHA's Proposed Rule on Occupational Exposure to Bloodborne Pathogens, April 19, 1990. NTIS No. PB-91-152-199.

1989. Testimony on OSHA's Proposed Rule on Occupational Exposure to Bloodborne Pathogens, September 12, 1989. NTIS No. PB-91-169-482, PB-91-169-581.

1989. Comments on OSHA's Proposed Rule and Notice of Hearing on Occupational Exposure to Bloodborne Pathogens, August 14, 1989. NTIS No. PB-90-161-969.

1989. Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers, February 1989. DHHS (NIOSH) Publication No. 89-107, NTIS No. PB-89-214-670.

1989. A Curriculum Guide for Public-Safety and Emergency-Response Workers: Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus, February 1989. DHHS (NIOSH) Publication No. 89-108, NTIS No. PB-89-227-854.

1988. Comments on OSHA's Advance Notice of Proposed Rulemaking on Occupational Exposure to Hepatitis B Virus and Human Immunodeficiency Virus, January 26, 1988. NTIS No. PB-90-133-117.

Boron trifluoride

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Boron Trifluoride. DHEW (NIOSH) Publication No. 77-122, NTIS No. PB-274-747.

Brakes

1988. Post-Hearing Comments on MSHA's Proposed Rule on Automatic Emergency-Parking Brakes for Rubber-Tired, Self-Propelled Electric Face Equipment, August 29, 1988. NTIS No. PB-90-132-630.

1988. Testimony on MSHA's Proposed Rule on Automatic Emergency-Parking Brakes for Rubber-Tired, Self-Propelled Electric Face Equipment, July 12, 1988. NTIS No. 89-121-214.

1988. Comments on MSHA's Proposed Rule on Automatic Emergency-Parking Brakes for Rubber-Tired, Self-Propelled Electric Face Equipment, April 29, 1988. NTIS No. PB-90-132-622.

1,3-Butadiene

1991. Post-Hearing Comments on OSHA's Proposed Rule on Occupational Exposure to 1,3-Butadiene, September 27, 1991. NTIS No. PB-92-135-979.

1991. NIOSH Risk Assessment: A Quantitative Assessment of the Risk of Cancer Associated with Exposure to 1,3-Butadiene Based on a Low Dose Inhalation Study in $B6C3F_1$ Mice. NTIS No. PB-92-136-159.

1991. Testimony on OSHA's Proposed Rule on Occupational Exposure to 1,3-Butadiene, January 17, 1991. NTIS No. PB-91-212-654.

1990. Comments on OSHA's Proposed Rule on Occupational Exposure to 1,3-Butadiene, November 9, 1990. NTIS No. PB-91-173-799.

1986. Comments on OSHA's Advance Notice of Proposed Rulemaking on Occupational Exposure to 1,3-Butadiene, December 1986. NTIS No. PB-91-152-850.

1986. Comments on OSHA's Request for Comments on Occupational Exposure to 1,3-Butadiene, January 1986. NTIS No. PB-91-152-280.

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Carcinogens (OSHA 13)

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Chromium(VI)

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1988. Comments on EPA's Proposed Rule on Prohibition of Hexavalent Chromium Chemicals in Comfort Cooling Towers, September 27, 1988. NTIS No. PB-91-135-061.

1975. Criteria for a Recommended Standard: Occupational Exposure to Chromium(VI). DHEW (NIOSH) Publication No. 76-129, NTIS No. PB-248-595.

Chrysene (also see Coal tar products)

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1978. Criteria for a Recommended Standard: Occupational Exposures in Coal Gasification Plants. DHEW (NIOSH) Publication No. 78-191, NTIS No. PB-80-164-874.

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1983. Post-Hearing Comments to OSHA on the Proposed Standard on Occupational Exposure to Cotton Dust, December 14, 1983. NTIS No. PB-91-135-103.

1983. Testimony to OSHA on the Proposed Standard on Occupational Exposure to Cotton Dust, September 21, 1983. NTIS No. PB-87-222-634.

1983. Comments to OSHA Docket H-052E: Cotton Dust; Proposed Occupational Health Standard, August 1983. NTIS No. PB-90-193-749.

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DDT

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1978. Criteria for a Recommended Standard: Occupational Exposure to Dibromochloropropane (DBCP). DHEW (NIOSH) Publication No. 78-115, NTIS No. PB-81-228-728.

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1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Dieldrin (see Aldrin)

Diesel exhaust

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1976. Current Intelligence Bulletin 12: Diethylcarbamoyl Chloride (DECC). In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

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1978. Criteria for a Recommended Standard: Occupational Exposure to Diisocyanates. DHEW (NIOSH) Publication No. 78-215, NTIS No. PB-81-226-615.

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1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

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1976. Current Intelligence Bulletin 11: Dimethylcarbamoyl Chloride (DMCC) (revised). In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

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1990. NIOSH Alert: Request for Assistance in Preventing Adverse Health Effects from Exposure to Dimethylformamide (DMF). DHHS (NIOSH) Publication No. 90-105, NTIS No. PB-91-152-710.

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1978. Criteria for a Recommended Standard: Occupational Exposure to Dinitro-Ortho-Cresol. DHEW (NIOSH) Publication No. 78-131, NTIS No. PB-80-175-870.

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1985. Current Intelligence Bulletin 44: Dinitrotoluenes (DNT). DHHS (NIOSH) Publication No. 85-109, NTIS No. PB-86-105-913.

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1977. Criteria for a Recommended Standard: Occupational Exposure to Dioxane. DHEW (NIOSH) Publication No. 77-226, NTIS No. PB-274-810.

Dioxin (see 2,3,7,8-Tetrachlorodibenzo-p-dioxin)

Dyes, benzidine-, o-tolidine-, and o-dianisidine-based

1980. OSHA/NIOSH Health Hazard Alert: Benzidine-, o-Tolidine-, and o-Dianisidine-Based Dyes. DHHS (NIOSH) Publication No. 81-106, NTIS No. PB-87-148-219.

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1988. Post-Hearing Comments on OSHA's Proposed Rule on Electrical Safety-Related Work Practices, October 11, 1988. NTIS No. PB–91–131–607.

1988. Testimony to the Department of Labor on the OSHA's Proposed Rule on Electrical Safety-Related Work Practices, August 9, 1988. NTIS No. PB–89–107–767.

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Electrocutions

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Emergency egress from elevated work stations

1975. Criteria for a Recommended Standard: Emergency Egress From Elevated Workstations. DHEW (NIOSH) Publication No. 76–128, NTIS No. PB–248–594.

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1978. Current Intelligence Bulletin 30: Epichlorohydrin. DHEW (NIOSH) Publication No. 79-105, NTIS No. PB-85-119-147.

1976. Criteria for a Recommended Standard: Occupational Exposure to Epichlorohydrin. DHEW (NIOSH) Publication No. 76-206, NTIS No. PB-81-227-019.

Ethylene dibromide

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1983. Comments to OSHA on the Proposed Standard: Occupational Exposure to Ethylene Dibromide, November 21, 1983. NTIS No. PB-91-169-383.

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1981. Current Intelligence Bulletin 37: Ethylene Dibromide (EDB) (revised). DHHS (NIOSH) Publication No. 82-105, NTIS No. PB-83-101-774.

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1975. Current Intelligence Bulletin 3: Ethylene Dibromide (EDB). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

Ethylene dichloride

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Revised Criteria for a Recommended Standard: Occupational Exposure to Ethylene Dichloride. DHEW (NIOSH) Publication No. 78-211, NTIS No. PB-80-176-092.

1978. Current Intelligence Bulletin 25: Ethylene Dichloride. DHEW (NIOSH) Publication No. 78-149, NTIS No. PB-85-119-212.

1978. Congressional Testimony before the Subcommittee on Oversight and Investigations, House Committee on Interstate and Foreign Commerce, January 23, 1978. NTIS No. PB-90-131-103.

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Ethylene glycol monobutyl ether/ethylene glycol monobutyl ether acetate (see Glycol ethers)

Ethylene glycol monoethyl ether/ethylene glycol monoethyl ether acetate (see Glycol ethers)

Ethylene glycol monomethyl ether/ethylene glycol monomethyl ether acetate (see Glycol ethers)

Ethyleneimine

1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Ethylene oxide

1989. Current Intelligence Bulletin 52: Ethylene Oxide Sterilizers in Health Care Facilities; Engineering Controls and Work Practices. DHHS (NIOSH) Publication No. 89-115, NTIS No. PB-90-142-571.

1988. Comments on OSHA's Proposed Rule on Occupational Exposure to Ethylene Oxide, February 22, 1988. NTIS No. PB-91-135-145.

1985. Comments to OSHA on a Short-Term Exposure Limit for Ethylene Oxide, September 26, 1985. NTIS No. PB-91-135-137.

1985. Comments to OSHA on Proposed Rule: Occupational Exposure to Ethylene Oxide; Labeling Requirements, April 30, 1985. NTIS No. PB-91-135-129.

1985. Comments to OSHA on Short-Term Exposures to Ethylene Oxide, March 19, 1985. NTIS No. PB-91-131-581.

1984. Comments to OSHA on the Evaluation of the OMB Comments on OSHA's Draft STEL for Ethylene Oxide, July 18, 1984. NTIS No. PB-91-153-650.

1983. Testimony on OSHA's Proposed Rule on Occupational Exposure to Ethylene Oxide, July 20, 1983. NTIS No. PB-84-182-039.

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Excavations

1988. Testimony on OSHA's Public Hearing on Safety Standards for Excavations in the Construction Industry, April 19, 1988. NTIS No. PB-91-152-256.

1987. Comments to OSHA on the Proposed Rule on Occupational Safety and Health Standards: Excavations, June 15, 1987. NTIS No. PB-91-152-397.

1985. NIOSH Alert: Request for Assistance in Preventing Deaths and Injuries from Excavation Cave-Ins. DHHS (NIOSH) Publication No. 85-110, NTIS No. PB-86-121-415.

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Explosives

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1976. Criteria for a Recommended Standard: Occupational Exposure to Hydrogen Cyanide and Cyanide Salts. DHEW (NIOSH) Publication No. 77-108, NTIS No. PB-266-230.

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1986. Comments on OSHA Request for Comments: Health and Safety Standards; Occupational Exposures to Toxic Substances in Laboratories, October 1986. NTIS No. PB-91-152-520.

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1988. Post-Hearing Comments on OSHA's Proposed Rule on the Control of Hazardous Energy Sources (Lockout/Tagout), November 28, 1988. NTIS No. PB-91-152-322.

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1983. Guidelines for Controlling Hazardous Energy During Maintenance and Servicing. DHHS (NIOSH) Publication No. 83-125, NTIS No. PB-84-199-934.

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1976. Criteria for a Recommended Standard: Occupational Exposure to Logging (from Felling to First Haul). DHEW (NIOSH) Publication No. 76-188, NTIS No. PB-266-411.

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1973. Criteria for a Recommended Standard: Occupational Exposure to Inorganic Mercury. DHEW (NIOSH) Publication No. 73-11024, NTIS No. PB-222-223.

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1976. Criteria for a Recommended Standard: Occupational Exposure to Methyl Alcohol. DHEW (NIOSH) Publication No. 76-148, NTIS No. PB-273-806.

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Methyl isocyanate

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1976. Criteria for a Recommended Standard: Occupational Exposure to Methyl Parathion. DHEW (NIOSH) Publication No. 77-106, NTIS No. PB-274-191.

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1976. Criteria for a Recommended Standard: Occupational Exposure to Methylene Chloride. DHEW (NIOSH) Publication No. 76–138, NTIS No. PB–81–227–027.

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1986. Current Intelligence Bulletin 47: 4,4'-Methylenedianiline (revised). DHHS (NIOSH) Publication No. 86–115, NTIS No. PB–87–104–527.

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1989. Comments to DOL, June 1988. NTIS No. PB–91–169–193.

1988. Comments on MSHA's Proposed Rules on Mandatory Safety Standards, June 9, 1988. NTIS No. PB–91–169–193.

Mining (air contaminants)

1986. Comments to MSHA on the Proposal Draft Regarding 30 CFR 75 Safety Standards for Underground Coal Mines; Ventilation, March 28, 1986. NTIS No. PB–91–169–458.

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Mobile equipment

1988. Comments on MSHA's Proposed Rules on Mandatory Safety Standards, June 9, 1988. NTIS No. PB–91–169–193.

Monohalomethanes

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB–91–115–337.

1984. Current Intelligence Bulletin 43: Monohalomethanes; Methyl Chloride, Methyl Bromide, Methyl Iodide. DHHS (NIOSH) Publication No. 84–117, NTIS No. PB–85–178–549.

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β-Naphthylamine, metabolic precursors

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1977. Special Occupational Hazard Review and Control Recommendations for Nickel Carbonyl, May 1977. DHEW (NIOSH) Publication No. 77-184, NTIS No. PB-273-795.

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1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Inorganic Nickel. DHEW (NIOSH) Publication No. 77-164, NTIS No. PB-274-201.

Nitric acid

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Nitric Acid. DHEW (NIOSH) Publication No. 76-141, NTIS No. PB-81-227-217.

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1978. Criteria for a Recommended Standard: Occupational Exposure to Nitriles. DHEW (NIOSH) Publication No. 78-212, NTIS No. PB-81-225-534.

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1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Nitroglycerin and ethylene glycol dinitrate

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Criteria for a Recommended Standard: Occupational Exposure to Nitroglycerin and Ethylene Glycol Dinitrate. DHEW (NIOSH) Publication No. 78-167, NTIS No. PB-81-225-526.

2-Nitropropane

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1980. Health Hazard Alert: OSHA/NIOSH—2-Nitropropane, October 1980. DHHS (NIOSH) Publication No. 80-142, NTIS No. PB-81-168-411.

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N-nitrosodimethylamine

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1987. Comments to OSHA's Request for Comments and Information Concerning the Occupational Noise Standard, December 29, 1987. NTIS No. PB-90-163-775.

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1975. Congressional Testimony before Government Regulation Subcommittee of the Senate, Small Business Committee, July 23, 1975. NTIS No. PB-89-238-059.

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1984. Comments to OSHA on the Proposed Rule on Oil and Gas Well Drilling and Servicing, October 10, 1984. NTIS No. PB-91-169-037.

1984. Testimony on OSHA Proposed Rule on Oil and Gas Well Drilling and Servicing, July 24-26, 1984. NTIS No. PB-87-222-840.

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1976. Criteria for a Recommended Standard: Occupational Exposure to Organotin Compounds. DHEW (NIOSH) Publication No. 77-115, NTIS No. PB-274-766.

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1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

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Paint and allied coatings manufacture

1984. Recommendations for Control of Occupational Safety and Health Hazards: Manufacture of Paint and Allied Coating Products. DHHS (NIOSH) Publication No. 84-115, NTIS No. PB-85-178-978.

Parathion

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Parathion. DHEW (NIOSH) Publication No. 76-190, NTIS No. PB-274-192.

Pattern of Violations (MSHA)

1989. Comments on MSHA's Proposed Rule on Pattern of Violations, August 30, 1989. NTIS No. PB-91-169-177.

Personal protective equipment (OSHA)

1990. Post-Hearing Comments to the Department of Labor on OSHA's Proposed Rule on Personal Protective Equipment for General Industry, July 13, 1990. NTIS No. PB-91-168-849.

1990. Testimony to the Department of Labor on OSHA's Proposed Rule on Personal Protective Equipment for General Industry, April 3, 1990. NTIS No. PB-91-169-169.

1990. Comments to the Department of Labor on OSHA's Proposed Rule on Personal Protective Equipment for General Industry, October 16, 1989. NTIS No. PB-91-169-474.

Pesticides manufacturing and formulation

1978. Criteria for a Recommended Standard: Occupational Exposure During the Manufacturing and Formulation of Pesticides. DHEW (NIOSH) Publication No. 78-174, NTIS No. PB-81-227-001.

1977. Congressional Testimony before the Subcommittee on Agricultural Research and General Legislation Senate Committee on Agriculture, Nutrition, and Forestry, December 14, 1977. NTIS No. PB-90-130-980.

Phenol

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1976. Criteria for a Recommended Standard: Occupational Exposure to Phenol. DHEW (NIOSH) Publication No. 76-196, NTIS No. PB-266-495.

Phosgene

1976. Criteria for a Recommended Standard: Occupational Exposure to Phosgene. DHEW (NIOSH) Publication No. 76-137, NTIS No. PB-267-514.

Polychlorinated biphenyls (PCB's)

1987. Comments on the EPA's Proposed Rule on Polychlorinated Biphenyls in Electrical Transformers, October 2, 1987. NTIS No. PB-91-169-029.

1987. Comments on the EPA's Proposed Rule on Polychlorinated Biphenyls: Exclusions, Exemptions, and Use Authorizations, September 4, 1987. NTIS No. PB-91-169-219.

1986. Current Intelligence Bulletin 45: Polychlorinated Biphenyls (PCB's): Potential Health Hazards from Electrical Equipment Fires or Failures. DHHS (NIOSH) Publication No. 86-111, NTIS No. PB-86-208-295.

1985. Testimony to the Ohio House of Representatives, May 16, 1985. NTIS No. PB-91-169-052.

1984. Comments to EPA's Proposed Rule: Polychlorinated Biphenyls (PCB's); Manufacture, Processing, Distribution in Commerce and Use Prohibitions Use in Electrical Transformers, December 14, 1984. NTIS No. PB-91-169-490.

1980. Congressional Testimony before the Subcommittee on Oversight and Investigations, House Committee on Interstate and Foreign Commerce, March 12, 1980. NTIS No. PB-90-194-432.

1977. Criteria for a Recommended Standard: Occupational Exposure to Polychlorinated Biphenyls. DHEW (NIOSH) Publication No. 77-225, NTIS No. PB-276-849.

1976. Current Intelligence Bulletin 7: Polychlorinated Biphenyls (PCB's). In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

Polynuclear aromatic hydrocarbons (PAH's)

See Carbon black and Coal tar products.

Precast concrete

1985. Comments on OSHA's Proposed Rule on Concrete and Masonry Construction, December 1985. NTIS No. PB-91-135-079.

1984. Comprehensive Safety Recommendations for the Precast Concrete Products Industry. DHHS (NIOSH) Publication No. 84-103, NTIS No. PB-85-220-051.

β-Propiolactone

1973. Statement on Proposed Permanent Standard for Certain Carcinogens at OSHA Hearing before Administrative Law Judge Burton Sternberg, September 14, 1973. NTIS No. PB-87-220-950.

Propylene oxide

1989. Current Intelligence Bulletin 51: Carcinogenic Effects of Exposure to Propylene Oxide. DHHS (NIOSH) Publication No. 89-111, NTIS No. PB-90-142-589.

Radiation, ionizing

1988. Post-Hearing Comments on MSHA's Proposed Rule: Ionizing Radiation Standards for Metal and Nonmetal Mines, February 26, 1988. NTIS No. PB-91-169-516.

1987. Criteria for a Recommended Standard: Occupational Exposure to Radon Progeny in Underground Mines. DHHS (NIOSH) Publication No. 88-101, NTIS No. PB-88-173-455.

1987. Testimony on MSHA's Proposed Rule: Ionizing Radiation Standards for Metal and Nonmetal Mines, August 13, 1987. NTIS No. PB-88-128-335.

1987. Comments on MSHA's Proposed Rule on Ionizing Radiation Standards for Underground Metal and Nonmetal Mines, February 17, 1987. NTIS No. PB-91-168-864.

1978. Congressional Testimony before the Subcommittee on Environment, Energy, and Natural Resources, House Committee on Government Operations, April 19, 1978. NTIS No. PB-90-130-998.

1977. Congressional Testimony before the Senate Committee on Commerce, Science, and Transportation, June 28, 1977. NTIS No. PB-90-130-626.

Radiation, nonionizing

1986. Comments on EPA's Notice of Proposed Recommendations, Federal Radiation Protection Guidance: Proposed Alternatives for Controlling Public Exposure to Radiofrequency Radiation, December 5, 1986. NTIS No. PB-91-212-670.

Radiofrequency sealers

1981. Congressional Testimony before the Subcommittee on Investigations and Oversight, House Committee on Science and Technology, May 13, 1981. NTIS No. PB-91-120-485.

1979. Current Intelligence Bulletin 33: Radiofrequency (RF) Sealers and Heaters: Potential Health Hazards and Their Prevention. DHEW (NIOSH) Publication No. 80-107, NTIS No. PB-80-176-332.

Radon progeny

1987. Criteria for a Recommended Standard: Occupational Exposure to Radon Progeny in Underground Mines. DHHS (NIOSH) Publication No. 88-101, NTIS No. PB-88-173-455.

1985. Comments on MSHA's Advance Notice of Proposed Rulemaking Metal and Nonmetal Mine Safety and Health, Radiation Standards 30 CFR Parts 56 and 57, March 18, 1985. NTIS No. PB-91-152-066.

1976. Current Intelligence Bulletin 10: Radon Daughters. In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

Recordkeeping guidelines

1989. Comments on MSHA's Advance Notice of Proposed Rulemaking on Notification, Investigation, Reports and Records of Accidents, Injuries, Illnesses, Employment, and Coal Production in Mines, February 24, 1989. NTIS No. PB-91-169-649.

1985. Comments on Proposed Revisions to Recordkeeping Guidelines for Occupational Injuries and Illnesses Under The Occupational Safety and Health Act of 1970 and 29 CFR 1904, September 1985. NTIS No. PB-91-168-823.

Refined petroleum solvents

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Refined Petroleum Solvents. DHEW (NIOSH) Publication No. 77-192, NTIS No. PB-85-178-267.

Rendering processes, animal

1981. Occupational Hazard Assessment: Criteria for Controlling Occupational Hazards in Animal Rendering Processes. DHHS (NIOSH) Publication No. 81-133, NTIS No. PB-82-232-307.

Respirable dust

1978. Testimony before the Department of Labor, Mine Safety and Health Administration, Public Hearing on Respirable Dust, July 1978. NTIS No. PB-91-152-298.

Respirators (Coast Guard)

1990. Comments on the United States Coast Guard's Proposed Rulemaking on Updating Approval and Carriage Requirements for Breathing Apparatus and Gas Masks, October 26, 1990. NTIS No. PB-91-173-708.

Respirators (NIOSH)

1987. NIOSH Respirator Decision Logic. DHHS (NIOSH) Publication No. 87-108, NTIS No. PB-88-149-612.

Respirators (OSHA)

1985. Comments to OSHA, Review of the Chlorine Institute Request for Variance (June 18, 1985, Federal Register, Vol. 50, No. 117, Pages 25343-25346), June 25, 1985. NTIS No. PB-91-169-615.

1985. Comments to OSHA, Review of the St. Joe Lead Company Application for Permanent Variance (Federal Register, Vol. 50, No. 115, June 14, 1985, pp. 24964-24966), June 25, 1985. NTIS No. PB-91-168-856.

1982. Comments to OSHA, Supplemental Report for Docket H-049A: Evaluation of Quantitative and Proposed Qualitative Screening Tests for Inadequate Fit Factors of Respirator Users, October 1982. NTIS No. PB-91-169-409.

1981. Comments to OSHA on the Requirements for Respirator Fit Testing in the OSHA Lead Standard, October 1981. NTIS No. PB-91-169-466.

Robotics

1984. NIOSH Alert: Request for Assistance in Preventing the Injury of Workers by Robots. DHHS (NIOSH) Publication No. 85-103, NTIS No. PB-85-236-818.

Safety and health programs

1988. Comments on OSHA's Request for Comments and Information on General Safety and Health Programs, August 26, 1988. NTIS No. PB-91-169-417.

Scaffolds

1991. NIOSH Alert: Request for Assistance in Preventing Electrocutions During Work with Scaffolds Near Overhead Power Lines. DHHS (NIOSH) Publication No. 91-110. Available from NTIS.

1987. Comments on OSHA's Notice of the Proposed Rule on Safety Standards for Scaffolds used in the Construction Industry, February 25, 1987. NTIS No. PB-91-169-391.

Shipyards

1989. Comments on OSHA's Shipyard Employment Safety Standards; Proposed Rules, February 28, 1989 (revised copy). NTIS No. PB-91-169-201.

Silica, crystalline

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1981. Current Intelligence Bulletin 36: Silica Flour: Silicosis, June 30, 1981. DHHS (NIOSH) Publication No. 81-137, NTIS No. PB-83-101-758.

1974. Criteria for a Recommended Standard: Occupational Exposure to Crystalline Silica. DHEW (NIOSH) Publication No. 75-120, NTIS No. PB-246-697.

Silos, oxygen-limiting

1986. NIOSH Alert: Request for Assistance in Preventing Fatalities Due to Fires and Explosions in Oxygen-Limiting Silos. DHHS (NIOSH) Publication No. 86-118, NTIS No. PB-87-111-399.

Skylights

1990. NIOSH Alert: Request for Assistance in Preventing Worker Deaths and Injuries from Falls Through Skylights and Roof Openings. DHHS (NIOSH) Publication No. 90-100, NTIS No. PB-90-195-157.

Sodium hydroxide

1975. Criteria for a Recommended Standard: Occupational Exposure to Sodium Hydroxide. DHEW (NIOSH) Publication No. 76-105, NTIS No. PB-246-694.

Solvents

1987. Current Intelligence Bulletin 48: Organic Solvent Neurotoxicity. DHHS (NIOSH) Publication No. 87-104, NTIS No. PB-87-194-593.

Stairways and ladders

1987. Comments on OSHA's Notice of Proposed Rulemaking on Safety Standards for Stairways and Ladders used in the Construction Industry, February 25, 1987. NTIS No. PB-91-169-599.

Styrene

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1983. Criteria for a Recommended Standard: Occupational Exposure to Styrene. DHHS (NIOSH) Publication No. 83-119, NTIS No. PB-84-148-295.

Suffocation

1987. NIOSH Alert: Request for Assistance in Preventing Entrapment and Suffocation Caused by the Unstable Surfaces of Stored Grain and Other Materials. DHHS (NIOSH) Publication No. 88-102, NTIS No. PB-88-188-735.

Sulfur dioxide

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Testimony to OSHA at the Public Hearing on Occupational Standard for Sulfur Dioxide, May 1977. NTIS No. 83-182-485.

1974. Criteria for a Recommended Standard: Occupational Exposure to Sulfur Dioxide. DHEW (NIOSH) Publication No. 74-111, NTIS No. PB-228-152.

Sulfuric acid

1974. Criteria for a Recommended Standard: Occupational Exposure to Sulfuric Acid. DHEW (NIOSH) Publication No. 74–128, NTIS No. PB–233–098.

Surveillance systems

1988. Comments on OSHA's Advance Notice of Proposed Rulemaking on Generic Standard for Exposure Monitoring, December 20, 1988. NTIS No. PB–91–169–557.

1988. Comments on OSHA's Advance Notice of Proposed Rulemaking on Generic Standard for Medical Surveillance Programs for Employees, December 20, 1988. NTIS No. PB–91–169–185.

1986. Testimony before the Subcommittee on Employment and Housing and the Subcommittee on Intergovernmental Relations and Human Resources, April 16, 1986. NTIS No. 89–138–721.

1984. Congressional Testimony before the Subcommittee on Manpower and Housing Committee on Government Operations, June 20, 1984. NTIS No. PB–91–169–664.

Synthetic vitreous fibers (manmade mineral fibers)

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB–91–115–337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Fibrous Glass. DHEW (NIOSH) Publication No. 77–152, NTIS No. PB–274–195.

Telecommunications

1987. Comments on OSHA's Proposed Rulemaking on Revision of Telecommunications Training Records, June 15, 1987. NTIS No. PB–91–169–425.

2,3,7,8-Tetrachlorodibenzo-p-dioxin

1984. Current Intelligence Bulletin 40: 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD, "dioxin"). DHHS (NIOSH) Publication No. 84–104, NTIS No. PB–84–198–001.

1983. Congressional Testimony on Dioxin before the Committee on Public Works and Transportation, Subcommittee on Investigations and Oversight, November 9, 1983. NTIS No. PB–90–179–144.

1,1,2,2–Tetrachloroethane

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB–91–115–337.

1978. Current Intelligence Bulletin 27: Chloroethanes; Review of Toxicity. DHEW (NIOSH) Publication No. 78–181, NTIS No. PB–85–119–196.

1976. Criteria for a Recommended Standard: Occupational Exposure to 1,1,2,2,-Tetrachloroethane. DHEW (NIOSH) Publication No. 77–121, NTIS No. PB–273–802.

Tetrachloroethylene (Perchloroethylene)

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB–91–115–337.

1978. Current Intelligence Bulletin 20: Tetrachloroethylene (Perchloroethylene). DHEW (NIOSH) Publication No. 78–112, NTIS No. PB–278–055.

1976. Criteria for a Recommended Standard: Occupational Exposure to Tetrachloroethylene (Perchloroethylene). DHEW (NIOSH) Publication No. 76-185, NTIS No. PB-266-583.

Thiols

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Criteria for a Recommended Standard: Occupational Exposure to N-Alkane Mono Thiols, Cyclohexanethiol, and Benzenethiol. DHEW (NIOSH) Publication No. 78-213, NTIS No. PB-81-225-609.

Tobacco smoke

1991. Current Intelligence Bulletin 54: Environmental Tobacco Smoke in the Workplace; Lung Cancer and Other Health Effects. DHHS (NIOSH) Publication No. 91-108, NTIS No. PB-91-235-374.

1979. Current Intelligence Bulletin 31: Adverse Health Effects of Smoking and the Occupational Environment. DHEW (NIOSH) Publication No. 79-122, NTIS No. PB-83-245-845.

o-Tolidine

1978. Criteria for a Recommended Standard: Occupational Exposure to o-Tolidine. DHEW (NIOSH) Publication No. 78-179, NTIS No. PB-81-227-084.

o-Tolidine-based dyes (see Dyes)

Toluene

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1973. Criteria for a Recommended Standard: Occupational Exposure to Toluene. DHEW (NIOSH) Publication No. 73-11023, NTIS No. PB-222-219.

Toluene diisocyanate (TDI)

1989. Current Intelligence Bulletin 53: Toluene Diisocyanate (TDI) and Toluenediamine (TDA); Evidence of Carcinogenicity. DHHS (NIOSH) Publication No. 90-101, NTIS No. PB-90-192-915.

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Criteria for a Recommended Standard: Occupational Exposure to Diisocyanates. DHEW (NIOSH) Publication No. 78-215, NTIS No. PB-81-226-615.

o-Toluidine

1990. NIOSH Alert: Request for Assistance in Preventing Bladder Cancer from Exposure to o-Toluidine and Aniline. DHHS (NIOSH) Publication No. 90-116, NTIS No. PB-91-188-953

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1,1,1-Trichloroethane

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Current Intelligence Bulletin 27: Chloroethanes; Review of Toxicity. DHEW (NIOSH) Publication No. 78-181, NTIS No. PB-85-119-196.

1976. Criteria for a Recommended Standard: Occupational Exposure to 1,1,1-Trichloroethane (Methyl Chloroform). DHEW (NIOSH) Publication No. 76-184, NTIS No. PB-267-069.

Trichloroethylene

1978. Special Occupational Hazard Review of Trichloroethylene. DHEW (NIOSH) Publication No. 78-130, NTIS No. PB-81-226-987.

1977. Criteria for a Recommended Standard: Occupational Exposure to Waste Anesthetic Gases and Vapors. DHEW (NIOSH) Publication No. 77-140, NTIS No. PB-274-238.

1975. Current Intelligence Bulletin 2: Trichloroethylene (TCE). In: NIOSH Current Intelligence Bulletin Reprints—Bulletins 1 thru 18 (1975-1977). DHEW (NIOSH) Publication No. 78-127, NTIS No. PB-83-105-080.

1973. Criteria for a Recommended Standard: Occupational Exposure to Trichloroethylene. DHEW (NIOSH) Publication No. 73-11025, NTIS No. PB-222-222.

Trimellitic anhydride

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Current Intelligence Bulletin 21: Trimellitic Anhydride (TMA). DHEW (NIOSH) Publication No. 78-121, NTIS No. PB-87-149-274.

Tungsten and cemented tungsten carbide

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Tungsten and Cemented Tungsten Carbide. DHEW (NIOSH) Publication No. 77-227, NTIS No. PB-275-594.

Ultraviolet radiation

1972. Criteria for a Recommended Standard: Occupational Exposure to Ultraviolet Radiation. DHEW (NIOSH) Publication No. 73-11009, NTIS No. PB-214-268.

Underground construction

1983. Comments to OSHA's Proposed Standard for Underground Construction, October 4, 1983. NTIS No. PB-91-169-433.

Vanadium

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Vanadium. DHEW (NIOSH) Publication No. 77-222, NTIS No. PB-81-225-658.

Vehicle Safety (OSHA)

1991. Post-Hearing Comments on OSHA's Proposed Rulemaking on Occupant Protection in Motor Vehicles, April 8, 1991. NTIS No. PB-91-213-157.

1991. Testimony at the OSHA Informal Public Hearing on OSHA's Proposed Rulemaking on Occupant Protection in Motor Vehicles, January 8, 1991. NTIS No. PB-91-213-132.

1990. Comments and Testimony on OSHA's Proposed Rulemaking on Occupant Protection in Motor Vehicles, December 14, 1990. NTIS No. PB-91-213-140.

Ventilation

1990. Testimony on MSHA's Report "Belt Entry Ventilation Review: Report of Findings and Recommendations," April 18, 1990. NTIS No. PB-91-169-011.

1989. Comments Regarding MSHA's Report "Belt Entry Ventilation Review: Report of Findings and Recommendations," November 22, 1989. NTIS No. PB-91-169-656.

1988. Post-Hearing Comments on MSHA's Proposed Rule on Safety Standards for Underground Coal Mine Ventilation, August 19, 1988. NTIS No. PB-91-169-441.

1988. Testimony on MSHA's Proposed Rule on Safety Standards for Underground Coal Mine Ventilation, June 16, 1988. NTIS No. PB-89-109-185.

1988. Comments on MSHA's Proposed Rule on Safety Standards for Underground Coal Mine Ventilation, April 28, 1988. NTIS No. PB-91-169-524.

Vibration syndrome (see Hand-arm vibration)

Video display terminals

1986. Testimony before the Subcommittee on Health and Safety, Committee on Education and Labor, June 4, 1986. NTIS No. PB-89-230-221.

1984. Congressional Testimony before the Subcommittee on Health and Safety, Committee on Education and Labor, May 15, 1984. NTIS No. PB-90-179-110.

Vinyl acetate

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1978. Criteria for a Recommended Standard: Occupational Exposure to Vinyl Acetate. DHEW (NIOSH) Publication No. 78-205, NTIS No. PB-80-176-993.

Vinyl chloride

1979. Criteria for a Recommended Standard: Occupational Exposure to Vinyl Halides. NTIS No. PB-84-125-699.

1978. Current Intelligence Bulletin 28: Vinyl Halides Carcinogenicity. DHEW (NIOSH) Publication No. 79-102, NTIS No. PB-85-119-162.

1974. Congressional Testimony before the Subcommittee on the Environment of the United States, Senate Commerce Committee, August 21, 1974. NTIS No. PB-89-238-190.

1974. Congressional Testimony before the Subcommittee on the Environment, Committee on Commerce, August 21, 1974. NTIS No. PB-89-238-026.

1974. Testimony on OSHA's Proposed Permanent Standard for Vinyl Chloride, June 25, 1974. NTIS No. PB-87-222-873.

1974. Criteria for a Recommended Standard: Occupational Exposure to Vinyl Chloride. NTIS No. PB-246-691.

Vinyl halides

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1979. Criteria for a Recommended Standard: Occupational Exposure to Vinyl Halides. NTIS No. PB-84-125-699.

1978. Current Intelligence Bulletin 28: Vinyl Halides Carcinogenicity. DHEW (NIOSH) Publication No. 79-102, NTIS No. PB-85-119-162.

Walking and Working Surfaces (OSHA)

1990. Post-Hearing Comments on OSHA's Proposed Rulemaking on Walking and Working Surfaces and Personal Protective Equipment (Fall Protection Systems), November 19, 1990. NTIS No. PB-91-173-930.

1990. Testimony on OSHA's Proposed Rulemaking on Walking and Working Surfaces and Personal Protective Equipment (Fall Protection Systems). NTIS No. PB-91-173-625.

1990. Comments on OSHA's Proposed Rulemaking on Walking and Working Surfaces and Personal Protective Equipment (Fall Protection Systems). NTIS No. PB-91-173-690.

Waste anesthetic gases and vapors

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1977. Criteria for a Recommended Standard: Occupational Exposure to Waste Anesthetic Gases and Vapors. DHEW (NIOSH) Publication No. 77-140, NTIS No. PB-274-238.

Water spray (fog)

1985. NIOSH Alert: Request for Assistance in Preventing Hazards in the Use of Water Spray (Fog) Streams to Prevent or Control Ignition of Flammable Atmospheres. DHHS (NIOSH) Publication No. 85-112, NTIS No. PB-86-121-423.

Welding

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1988. Criteria for a Recommended Standard: Occupational Exposure to Welding, Brazing, and Thermal Cutting. DHHS (NIOSH) Publication No. 88-110, NTIS No. PB-88-231-774.

Wood dust

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1987. Health Effects of Exposure to Wood Dust: A Summary of the Literature. NTIS No. PB-87-218-251.

Worker notification

1985. Congressional Testimony before the Subcommittee on Health and Safety and Subcommittee on Labor Standards, November 20, 1985. NTIS No. PB-91-169-532.

Xylene

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1975. Criteria for a Recommended Standard: Occupational Exposure to Xylene. DHEW (NIOSH) Publication No. 75-168, NTIS No. PB-246-702.

Zinc oxide

1988. Testimony on OSHA's Proposed Rule on Air Contaminants, August 1, 1988. NTIS No. PB-91-115-337.

1975. Criteria for a Recommended Standard: Occupational Exposure to Zinc Oxide. DHEW (NIOSH) Publication No. 76-104, NTIS No. PB-246-693.

SECTION B

NIOSH RELs AND GENERAL RECOMMENDATIONS FOR SAFETY AND HEALTH

This section contains three tables listing occupational hazards and the NIOSH RELs and general recommendations for safety and health. Table 1 lists chemical hazards, Table 2 presents physical hazards, and Table 3 contains industry, process, and work environment hazards. Health effects cited in Tables 1 and 2 are those generally associated with the hazard; they are for humans unless otherwise noted. Consult primary sources in Section A for definitive information. The Chemical Abstracts Service (CAS) number and the Registry of Toxic Effects of Chemical Substances (RTECS) number are included in Table 1 where appropriate.

Table 1.—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Acetaldehyde†	75-07-0 AB1925000	Ca (18 ppm LOQ)	Potential for cancer; eye, skin, and respiratory irritation; nasal tumors in animals; mutagenesis in vitro
Acetic acid†,‡	64-19-7 AF1225000	10 ppm (25 mg/m^3) TWA, 15 ppm (37 mg/m^3) STEL	Skin, eye, and mucous membrane irritation
Acetic anhydride†	108-24-7 AK1925000	5 ppm (20 mg/m^3) ceiling	Skin, eye, and respiratory irritation
Acetone‡ *Class: Ketones*§	67-64-1 AL3150000	250 ppm (590 mg/m^3) TWA	Narcosis; CNS depression; eye, nose, throat, and skin irritation
Acetone cyanohydrin *Class: Nitriles*§	75-86-5 OD9275000	1 ppm (4 mg/m^3) ceiling (15-min)	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects resulting from dissociation of the compound to hydrogen cyanide
Acetonitrile *Class: Nitriles*§	75-05-8 AL7700000	20 ppm (34 mg/m^3) TWA	Eye, nose, and throat irritation from vapor; skin and eye irritation from liquid; nervous system effects
2-Acetylaminofluorene	53-96-3 AB9450000	Ca; use 29 CFR 1910.1014	Potential for cancer; tumors of the liver, bladder, lungs, pancreas, and skin in animals
Acetylene	74-86-2 AO9600000	2,500 ppm (2,662 mg/m^3) ceiling (15-min)	Asphyxia

Acetylene dichloride (see 1,2-Dichloroethylene)			
Acetylene tetrabromide (see Appendix III)	79-27-6 KI8225000		
Acetylsalicylic acid[†] (aspirin)	50-78-2 VO0700000	5 mg/m^3 TWA	Mucosal irritation, respiratory effects, internal bleeding
Acrolein[†,‡]	107-02-8 AS1050000	0.1 ppm (0.25 mg/m^3) TWA, 0.3 ppm (0.8 mg/m^3) STEL	Eye, nose, respiratory, and mucous membrane irritation
Acrylamide[••]	79-06-1 AS3325000	Ca; 0.03 mg/m^3 TWA (skin)	Potential for cancer, skin irritation, central and peripheral nervous system effects; reproductive effects and tumors of the lung, testes, thyroid, and adrenal glands in animals
Acrylic acid[†]	79-10-7 AS4375000	2 ppm (6 mg/m^3) TWA (skin)	Skin, eye, and respiratory irritation
Acrylonitrile[‡] (vinylcyanide)	107-13-1 AT5250000	Ca; 1 ppm, 8-hr TWA, 10 ppm ceiling (15-min) (skin)	Brain tumors, lung and bowel cancer
Adiponitrile *Class: Nitriles*[§]	111-69-3 AV2625000	4 ppm (18 mg/m^3) TWA	Skin and eye irritation; respiratory, circulatory, and CNS effects in animals
Aldehydes[§]	††	See individual chemical	

[•]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[••]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Aldrin[‡,**]	309-00-2 IO2100000	Ca; 0.25 mg/m^3 TWA (skin) (0.15 mg/m^3 LOQ)	Potential for cancer; tumors of the lungs, liver, thyroid, and adrenal glands in animals
Alkanes[§]	††	See individual chemical	
Allyl alcohol[†‡]	107-18-6 BA5075000	2 ppm (5 mg/m^3) TWA (skin), 4 ppm (10 mg/m^3) STEL	Upper respiratory irritation and burns of the eyes and skin
Allyl chloride[**]	107-05-1 UC7350000	1 ppm (3 mg/m^3) TWA, 2 ppm (6 mg/m^3) STEL Liver, kidney, and lung effects	
Allyl glycidyl ether[**] (AGE) *Class: Glycidyl ethers*[§]	106-92-3 RR0875000	5 ppm (22 mg/m^3) TWA, 10 ppm (44 mg/m^3) STEL (skin)	Skin and mucous membrane effects, dermatitis and eye irritation, possible hematopoietic and reproductive system effects
Allyl propyl disulfide[†]	2179-59-1 JO0350000	2 ppm (12 mg/m^3) TWA, 3 ppm (18 mg/m^3) STEL	Eye, nose, and upper respiratory irritation
α-Alumina (see Appendix III)			

Aluminum metal[†]	7429-90-5 BD0330000		
Total dust		10 mg/m^3 TWA	Lung changes that may lead to pulmonary fibrosis
Respirable fraction		5 mg/m^3 TWA	
Pyro powders		5 mg/m^3 TWA	
Welding fumes		5 mg/m^3 TWA	Respiratory and skin irritation
Soluble salts		2 mg/m^3 TWA	Skin irritation
Alkyls		2 mg/m^3 TWA	Skin irritation
4-Aminodiphenyl	92-67-1 DU8925000	Ca; use 29 CFR 1910.1011	Bladder cancer
2-Aminoethanol (see Ethanolamine)			
2-Aminopyridine[†,‡]	504-29-0 US1575000	0.5 ppm (2 mg/m^3) TWA	CNS excitation, convulsions, severe acute effects
Amitrole[†,‡]	61-82-5 XZ3850000	Ca; 0.2 mg/m^3, 8-hr TWA	Potential for cancer; tumors of the thyroid and pituitary glands in animals
Ammonia[‡,**]	7664-41-7 BO0875000	25 ppm (18 mg/m^3) TWA, 35 ppm (27 mg/m^3) STEL	Respiratory and eye irritation
Ammonium chloride fume[†]	12125-02-9 BP4550000	10 mg/m^3 TWA, 20 mg/m^3 STEL	Skin and respiratory irritation

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Ammonium sulfamate†‡	7773-06-0 WO6125000		Eye and nose irritation, interference with vision
Total dust		10 mg/m³ TWA	
Respirable dust		5 mg/m³ TWA	
n-Amyl acetate†	628-63-7 AJ1925000	100 ppm (525 mg/m³) TWA	Acute irritation of the eyes and upper respiratory tract, possible CNS depression, chronic skin irritation
sec-Amyl acetate†	626-38-0 AJ2100000	125 ppm (650 mg/m³) TWA	Eye and upper respiratory irritation; possible CNS depression (narcosis); lung, liver, and kidney injury
Aniline and homologs	62-53-3 BW6650000	Ca; lowest feasible concentration	Potential for cancer; tumors of the spleen in animals
o-Anisidine†	90-04-0 BZ5410000	Ca; 0.5 mg/m³ TWA (skin)	Potential for cancer; tumors of the bladder, thyroid, and kidneys in animals
p-Anisidine†	104-94-9 BZ5450000	0.5 mg/m³ TWA (skin)	CNS, blood, urogenital system, liver, and skin effects
Antimony	7440-36-0 CC4025000	0.5 mg/m³ TWA	Irritation, cardiovascular and lung effects
α-Naphthylthiourea† (ANTU)	86-88-4 YT9275000	0.3 mg/m³ TWA	Drug rashes, decrease in white blood cells, pulmonary edema

Arsenic, inorganic[§]	7440-38-2 CG0525000	Ca; 0.002 mg/m^3 ceiling (15-min)	Lung and lymphatic cancer, dermatitis
Arsine	7784-42-1 CG6475000	Ca; 0.002 mg/m^3 ceiling (15-min)	Cancer, sudden extensive hemolysis
Asbestos[§]	1332-21-4 CI6475000	Ca; 0.1 fiber/cc in a 400-liter air sample (fibers >5 μm long), 100-min TWA; (use 29 CFR 1910.1001)	Lung cancer, mesothelioma, asbestosis
Asphalt fumes[**]	8052-42-4 CI9900000	Ca; 5 mg/m^3 ceiling (15-min) measured as total particulates	Potential for cancer; tumors of the skin in animals; eye and respiratory tract irritation
Atrazine[†,‡]	1912-24-9 XY5600000	5 mg/m^3 TWA	Primary eye and skin irritation; ingestion can cause ataxia, dyspnea, and convulsions in animals
Azinphos-methyl (Guthion®)[†,‡]	86-50-0 TE1925000	0.2 mg/m^3 TWA (skin)	Cholinesterase inhibition after metabolic activation
Barium,[†] soluble compounds	7440-39-3 CQ8370000	0.5 mg/m^3 TWA	Eye, mucous membrane, and skin irritation
Barium sulfate[†]	7727-43-7 CR0600000		Eye, nose, and upper respiratory irritation; pneumoconiosis
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Benomyl‡ (see Appendix III)	17804-35-2 DD6475000		
Benzene	71-43-2 CY1400000	Ca; 0.1 ppm (0.32 mg/m^3), 8-hr TWA, 1 ppm (3.2 mg/m^3) ceiling (15-min)	Cancer (leukemia)
Benzenethiol (phenyl mercaptan) *Class: Thiols*§	108-98-5 DC0525000	0.1 ppm (0.5 mg/m^3) ceiling	Eye and skin irritation, blood and nervous system effects
Benzidine	92-87-5 DC9625000	Ca; use 29 CFR 1910.1010	Bladder, liver, and kidney cancer
Benzidine-based dyes	††	Ca; lowest feasible concentration	Bladder cancer
Benzo(a)pyrene (see Coal tar pitch volatiles)			
p-Benzoquinone (see Quinone)			
Benzoyl peroxide	94-36-0 DM8575000	5 mg/m^3 TWA	Respiratory and eye irritation, skin effects
Benzyl chloride	100-44-7 XS8925000	1 ppm (5 mg/m^3) ceiling (15-min)	Eye and skin irritation

Beryllium[§]	7440-41-7 DS1750000	Ca; not to exceed 0.0005 mg/m^3	Lung cancer, berylliosis
Biphenyl (see Diphenyl)			
Bismuth telluride,[†] Se-doped	1304-82-1 EB3110000	5 mg/m^3 TWA	Pulmonary lesions in animals
Bismuth telluride,[†] undoped	1304-82-1 EB3110000		Skin and eye irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Borates,[†] tetra sodium salts			Skin, eye, and upper respiratory irritation; possible shortness of breath and nose bleeds
Anhydrous	1303-43-4 VZ224000	1 mg/m^3 TWA	
Decahydrate	1303-96-4 VZ2275000	5 mg/m^3 TWA	
Pentahydrate	12179-04-3 VZ2540000	1 mg/m^3 TWA	
Boron oxide,[†] total dust	1303-86-2 ED7900000	10 mg/m^3 TWA	Eye and respiratory irritation
Boron tribromide[†]	10294-33-4 ED7400000	1 ppm (10 mg/m^3) ceiling	Pulmonary damage
Boron trifluoride[†]	7637-07-2 ED2275000	1 ppm (3 mg/m^3) ceiling	Severe irritation of the lungs, eyes, and skin

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Bromacil[†,‡]	314-40-9 YQ9100000	1 ppm (10 mg/m^3) TWA	Eye irritation; thyroid damage in animals
Bromine[†]	7726-95-6 EF9100000	0.1 ppm (0.7 mg/m^3) TWA, 0.3 ppm (2 mg/m^3) STEL	Severe irritation of the eyes, mucous membranes, lungs, and skin
Bromine pentafluoride[†]	7789-30-2 EF9350000	0.1 ppm (0.7 mg/m^3) TWA	Skin irritation, corneal necrosis
Bromoform[†]	75-25-2 PB5600000	0.5 ppm (5 mg/m^3) TWA (skin)	Respiratory irritation, CNS depression
1,3-Butadiene	106-99-0 EI9275000	Ca; lowest feasible concentration (0.19 ppm LOQ)	Hematopoietic cancer, teratogenic and reproductive effects
Butane[†]	106-97-8 EI4200000	800 ppm (1,900 mg/m^3) TWA	Drowsiness and other narcotic effects
1-Butanethiol (butyl mercaptan) *Class: Thiols*[§]	109-79-5 EK6300000	0.5 ppm (1.8 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects
2-Butanone (see Methyl ethyl ketone [MEK])			
2-Butoxyethanol (see Ethylene glycol monobutyl ether) (EGBE)			

2-Butoxyethyl acetate (see Ethylene glycol monobutyl ether acetate)(EGBEA)			
n-Butyl acetate†	123-86-4 AF7350000	150 ppm (710 mg/m^3) TWA, 200 ppm (950 mg/m^3) STEL	Mucous membrane and eye irritation; high concentrations cause nervous system effects in animals
sec-Butyl acetate†	105-46-4 AF7380000	200 ppm (950 mg/m^3) TWA	Eye and respiratory irritation, CNS depression
tert-Butyl acetate†	540-88-5 AF7400000	200 ppm (950 mg/m^3) TWA	Eye and throat irritation, CNS depression
Butyl acrylate†	141-32-2 UD3150000	10 ppm (55 mg/m^3) TWA	Eye and skin irritation
n-Butyl alcohol†	71-36-3 EO140000	50 ppm (150 mg/m^3) ceiling (skin)	Eye and mucous membrane irritation, CNS depression
sec-Butyl alcohol†	78-92-2 EO1750000	100 ppm (305 mg/m^3) TWA, 150 ppm (455 mg/m^3) STEL	Eye and skin irritation; narcosis in animals
tert-Butyl alcohol†,‡	75-65-0 EO1925000	100 ppm (300 mg/m^3) TWA, 150 ppm (450 mg/m^3) STEL	Narcosis in animals
Butylamine†	109-73-9 EO2975000	5 ppm (15 mg/m^3) ceiling (skin)	Eye, mucous membrane, and skin irritation

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
tert-Butyl chromate *Class: Chromium*[§], *hexavalent*	1189-85-1 GB2900000	Ca; 0.001 mg/m^3 TWA	Lung cancer, skin ulcers, lung irritation
Butyl glycidyl ether (BGE) *Class: Glycidyl ethers*[§]	2426-08-6 TX4200000	5.6 ppm (30 mg/m^3) ceiling (15-min)	Skin and mucous membrane effects, sensitization potential, possible hematopoietic effects
n-Butyl lactate[†]	138-22-7 OD4025000	5 ppm (25 mg/m^3) TWA	Headache, irritation of the pharyngeal and laryngeal mucosa
Butyl mercaptan (see 1-Butanethiol)			
o-sec-Butylphenol[†]	89-72-5 SJ8920000	5 ppm (30 mg/m^3) TWA (skin)	Skin, eye, and respiratory irritation; skin burns
p-tert-Butyltoluene[†]	98-51-1 XS8400000	10 ppm (60 mg/m^3) TWA, 20 ppm (120 mg/m^3) STEL	Mucous membrane irritation
n-Butyronitrile *Class: Nitriles*[§]	109-74-0 ET8750000	8 ppm (22 mg/m^3) TWA	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Cadmium,[§] dust and fume	7440-43-9 EU9800000	Ca; lowest feasible concentration (0.01 mg/m^3 LOQ)	Lung cancer, prostatic cancer, renal system effects

Calcium carbonate†	1317-65-3 EV9580000		Moderate skin irritation, severe eye irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Calcium cyanamide†,‡	156-62-7 GS6000000	0.5 mg/m^3 TWA	Eye, skin, and lung irritation
Calcium hydroxide†	1305-62-0 EW2800000	5 mg/m^3 TWA	Caustic irritation of all exposed body surfaces and the respiratory tract
Calcium oxide†	1305-78-8 EW3100000	2 mg/m^3 TWA	Eye, mucous membrane, and skin irritation
Calcium silicate†	1344-95-2 VV9150000		Physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Calcium sulfate†	7778-18-9 WS6920000		Physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Camphor, synthetic†,‡	76-22-2 EX1225000	2 mg/m^3 TWA	Eye, skin, and mucous membrane irritation; CNS effects

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Caprolactam†	105-60-2 CM3675000		Convulsions, dermal and respiratory irritation, dermal sensitization
Dust		1 mg/m^3 TWA, 3 mg/m^3 STEL	
Vapor		0.22 ppm (1 mg/m^3) TWA, 0.66 ppm (3 mg/m^3) STEL	
Captafol†,‡ (Difolatan®)	2425-06-1 GW4900000	Ca; 0.1 mg/m^3 TWA (skin)	Potential for cancer; skin and respiratory irritation; cancers in mice
Captan†,‡	133-06-2 GW5075000	Ca; 5 mg/m^3 TWA	Potential for cancer; duodenal tumors in animals
Carbaryl‡ (Sevin®)	63-25-2 FC5950000	5 mg/m^3 TWA; minimize exposure during pregnancy	CNS and reproductive effects
Carbofuran†,‡ (Furadan®)	1563-66-2 FB9450000	0.1 mg/m^3 TWA	Anticholinesterase agent
Carbon black	1333-86-4 FF5800000	3.5 mg/m^3 TWA; In presence of PAHs: Ca; limit PAHs to 0.1 mg/m^3 TWA (determined as cyclohexane extractable fraction)	Lung, cardiovascular, and skin effects; cancer of the lymphatic/bone-marrow complex when workers are exposed to carbon black in the presence of PAHs
Carbon dioxide**	124-38-9 FF6400000	5,000 ppm (9,000 mg/m^3) TWA, 30,000 ppm (54,000 mg/m^3) STEL	Respiratory effects

Carbon disulfide[‡,**]	75-15-0 FF6650000	1 ppm (3 mg/m^3) TWA (skin), 10 ppm (30 mg/m^3) STEL (skin)	Cardiovascular, CNS, and reproductive effects
Carbon monoxide	630-08-0 FG3500000	35 ppm (40 mg/m^3) 8-hr TWA, 200 ppm (229 mg/m^3) ceiling	Cardiovascular effects
Carbon tetrabromide[†]	558-13-4 FG4725000	0.1 ppm (1.4 mg/m^3) TWA, 0.3 ppm (4 mg/m^3) STEL	Eye, skin, lung, and kidney irritation; severe liver toxicity
Carbon tetrachloride[‡,**] (tetrachloromethane)	56-23-5 FG4900000	Ca; 2 ppm (12.6 mg/m^3) STEL (60-min)	Liver cancer
Carbonyl fluoride[†]	353-50-4 FG6125000	2 ppm (5 mg/m^3) TWA, 5 ppm (15 mg/m^3) STEL	Toxic effects from the liberation of fluoride by hydrolysis
Catechol[†] (pyrocatechol)	120-80-9 UX1050000	5 ppm (20 mg/m^3) TWA (skin)	CNS depression; liver, respiratory, and renal effects
Cellulose[†]	9004-34-6 FJ5691460		Eye, skin, and physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Cesium hydroxide[†]	21351-79-1 FK9800000	2.0 mg/m^3 TWA	Skin, eye, and respiratory irritation
Cetylmercaptan (see 1-Hexadecanethiol)			

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[**]REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Chlordane†‡	57-74-9 PB9800000	Ca; 0.5 mg/m³ TWA (skin)	Potential for cancer, CNS effects (e.g., irritability, tremors, and convulsions), skin and mucous membrane irritation, kidney and nerve damage; liver cancer in animals
Chlorinated camphene†	8001-35-2 XW5250000	Ca; lowest feasible concentration (skin) (0.01 mg/m³ LOQ)	Potential for cancer, skin irritation, strong CNS stimulation; cancer in animals
Chlorinated diphenyl oxide†	55720-99-5 KO4200000	0.5 mg/m³ TWA	Skin irritation, dermatitis; liver damage in animals
Chlorine‡	7782-50-5 FO2100000	0.5 ppm (1.45 mg/m³) ceiling (15-min)	Severe eye, mucous membrane, and skin irritation
Chlorine dioxide†‡	10049-04-4 FO3000000	0.1 ppm (0.3 mg/m³) TWA, 0.3 ppm (0.9 mg/m³) STEL	Severe respiratory and eye irritation
Chlorine trifluoride†	7790-91-2 FO2800000	0.1 ppm (0.4 mg/m³) ceiling	Severe eye, respiratory, and skin irritation
Chloroacetaldehyde†	107-20-0 AB2450000	1 ppm (3 mg/m³) ceiling	Throat, nose, and lung irritation; severe eye irritation; skin burns
α-Chloroacetophenone† (phenacyl chloride)	532-27-4 AM6300000	0.05 ppm (0.3 mg/m³) TWA	Eye and upper respiratory irritation, possible conjunctivitis and corneal damage
Chloroacetyl chloride†	79-04-9 AO6475000	0.05 ppm (0.2 mg/m³) TWA	Skin and respiratory irritation

Chlorobenzene (see Appendix III)	108-90-7 CZ0175000		
o-Chlorobenzylidene malononitrile†	2698-41-1 OO3675000	0.05 ppm (0.4 mg/m^3) ceiling (skin)	Eye and respiratory irritation
Chlorobromomethane†	74-97-5 PA5250000	200 ppm (1,050 mg/m^3) TWA	Narcotic effects, eye and respiratory irritation
2-Chloro-1,3-butadiene (see ß-Chloroprene)			
Chlorodifluoromethane†	75-45-6 PA6390000	1,000 ppm (3,500 mg/m^3) TWA, 1,250 ppm (4,375 mg/m^3) STEL	Asphyxia; chronic changes in the lungs, CNS, liver, kidneys, and spleen
Chlorodiphenyl (42% chlorine) (Aroclor 1242) *Class: Polychlorinated biphenyls*§	53469-21-9 TQ1356000	Ca; 0.001 mg/m^3 TWA	Potential for cancer, skin, liver, and reproductive effects; tumors of the liver and pituitary gland and leukemias in animals
Chlorodiphenyl (54% chlorine) (Aroclor 1254) *Class: Polychlorinated biphenyls*§	11097-69-1 TQ1360000	Ca; 0.001 mg/m^3 TWA	Potential for cancer and skin, liver, and reproductive effects; tumors of the liver and pituitary gland and leukemias in animals
1-Chloro-2,3-epoxypropane (see Epichlorohydrin)			

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Chloroethanes[§]	††	See individual chemical	
2-Chloroethanol (see Ethylene chlorohydrin)			
Chloroethylene (see Vinyl chloride)			
Chloroform[‡,**] (trichloromethane)	67-66-3 FS9100000	Ca; 2 ppm (9.78 mg/m^3) STEL (60-min)	Potential for cancer, CNS effects; cancer of the liver and kidneys in animals
bis(Chloromethyl) ether	542-88-1 KN1575000	Ca; use 29 CFR 1910.1008	Lung cancer
Chloromethyl methyl ether (methyl chloromethyl ether)	107-30-2 KN6650000	Ca; use 29 CFR 1910.1006	Potential for cancer; skin and lung cancer in animals
1-Chloro-1-nitropropane[†]	600-25-9 TX5075000	2 ppm (10 mg/m^3) TWA	Pulmonary irritation; liver, kidney, and heart damage in animals
Chloropentafluoroethane[†]	76-15-3 KH7877500	1,000 ppm (6,320 mg/m^3) TWA	Cardiotoxicity; skin, CNS, and respiratory effects
Chloropicrin[†,‡] (nitrotrichloromethane)	76-06-2 PB6300000	0.1 ppm (0.7 mg/m^3) TWA	Severe eye, skin, and respiratory irritation
ß-Chloroprene (2-chloro-1,3-butadiene)	126-99-8 EI9625000	Ca; 1 ppm (3.6 mg/m^3) ceiling	Lung and skin cancer, reproductive effects

o-Chlorostyrene†	2039-87-4 WL4160000	50 ppm (285 mg/m^3) TWA, 75 ppm (430 mg/m^3) STEL	Liver and kidney changes
o-Chlorotoluene†	95-49-8 XS9000000	50 ppm (250 mg/m^3) TWA, 75 ppm (375 mg/m^3) STEL	Moderate skin and eye irritation
2-Chloro-6-trichloromethyl pyridine†	1929-82-4 US7525000		
Total dust		10 mg/m^3 TWA, 20 mg/m^3 STEL	
Respirable fraction		5 mg/m^3 TWA	
Chlorpyrifos†,‡	2921-88-2 TF63000000	0.2 mg/m^3 TWA, 0.6 mg/m^3 STEL (skin)	Depression of plasma cholinesterase
Chromic acid‡	7738-94-5 GB2450000	Ca; carcinogenic Cr(VI), 0.001 mg Cr(VI)/m^3 10-hr TWA	Lung cancer, skin ulcers, and lung irritation
Chromium, hexavalent§ [Cr(VI)]	18540-29-9 GB6262000	Ca; carcinogenic Cr(VI), 0.001 mg/m^3 10-hr TWA	Lung cancer
Chromium(II) compounds†	22541-79-3 GB6260000	0.5 mg/m^3 TWA	Low-order toxicity
Chromium(III) compounds†	16065-83-1 GB6261000	0.5 mg/m^3 TWA	Low-order toxicity

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Chromium metal†	7440-47-3 GB4200000	0.5 mg/m^3 TWA	Pulmonary effects
Chromyl chloride *Class: Chromium, hexavalent*§	14977-61-8 GB5775000	Ca; 0.001 mg/m^3 TWA [Cr(VI)]	Respiratory cancer
Chrysene	218-01-9 GC0700000	Ca; lowest feasible concentration	Liver and skin cancer
Clopidol†	2971-90-6 UU7711500		Eye and skin irritation
Total dust		10 mg/m^3 TWA, 20 mg/m^3 STEL	
Respirable fraction		5 mg/m^3 TWA	
Coal dust (<5% SiO_2) (see Appendix III)	††		
Coal dust (>5% SiO_2) (see Appendix III)	††		
Coal tar pitch volatiles‡ *Class: Coal tar products*§	65996-93-2 GF8655000	Ca; 0.1 mg/m^3 TWA (cyclohexane extractable fraction)	Lung and skin cancer
Cobalt metal,† dust, and fume *Class: Cobalt*§	7440-48-4 GF8750000	0.05 mg/m^3 TWA	Dermatitis, potential for pulmonary fibrosis

Cobalt carbonyl[†] *Class: Cobalt*[§]	10210-68-1 GG0300000	0.1 mg/m^3 TWA	Respiratory irritation
Cobalt hydrocarbonyl[†] *Class: Cobalt*[§]	16842-03-8 GG0900000	0.1 mg/m^3 TWA	Respiratory irritation
Coke oven emissions	†† GH0346000	Ca; 0.5–0.7 mg/m^3 (total particulates as screening level)	Lung and bladder cancer
Copper[†]	7440-50-8 GL5325000		Upper respiratory irritation
Fume		0.1 mg/m^3 TWA	
Dusts and mists		1 mg/m^3 TWA	
Cotton dust	†† GN2275000	Lowest feasible concentration (<0.2 mg/m^3 lint-free cotton dust)	Pulmonary disease (byssinosis)
Crag® herbicide[†] (Sesone)	136-78-7 KK4900000		Eye and skin irritation; liver and kidney damage; dust causes nervous system effects and convulsions in animals
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	

[•]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Cresol[‡], all isomers	1319-77-3 GO5950000	2.3 ppm (10 mg/m^3) TWA	Skin, liver, kidney, and pancreas effects
m-Cresol	108-39-4 606125000		
o-Cresol	95-48-7 606300000		
p-Cresol	106-44-5 606475000		
Crotonaldehyde[†]	123-73-9 GP9625000	2 ppm (6 mg/m^3) TWA	Eye and respiratory irritation
Crufomate[†,‡]	299-86-5 TB3850000	5 mg/m^3 TWA, 20 mg/m^3 STEL	Neurotoxicity, cholinesterase inhibition
Cumene[†]	98-82-8 GR8575000	50 ppm (245 mg/m^3) TWA (skin)	Eye, skin, and upper respiratory irritation
Cyanamide[†]	420-04-2 GS5950000	2 mg/m^3 TWA	Skin irritation
Cyanides *Class: Hydrogen cyanide and cyanide salts*[§]	††	4.7 ppm (5 mg/m^3) ceiling (10-min)	Thyroid, blood, and respiratory effects
Cyanogen[†]	460-19-5 GT1925000	10 ppm (20 mg/m^3) TWA	Respiratory and eye irritation

Cyanogen chloride[†,‡]	506-77-4 GT2275000	0.3 ppm (0.6 mg/m^3) ceiling	Severe eye and pulmonary irritation
Cyclohexane[†,‡]	110-82-7 GU6300000	300 ppm (1,050 mg/m^3) TWA	Local irritation and CNS depression
Cyclohexanethiol (cyclohexylmercaptan)	1569-69-3 GV7525000	0.5 ppm (2.4 mg/m^3) ceiling	Irritation; eye, skin, blood, and nervous system effects
Cyclohexanol[†]	108-93-0 GV7875000	50 ppm (200 mg/m^3) TWA (skin)	Eye, nose, throat, and skin irritation; narcotic effect at high concentrations
Cyclohexanone[‡,**] *Class: Ketones*[§]	108-94-1 GW1050000	25 ppm (100 mg/m^3) TWA (skin)	Irritation; liver, kidney, and nervous system effects
Cyclohexene[†]	110-83-8 GW2500000	300 ppm (1,015 mg/m^3) TWA	Mild respiratory irritation, CNS depression
Cyclohexylamine[†]	108-91-8 GX0700000	10 ppm (40 mg/m^3) TWA	Severe skin and eye irritation and sensitization
Cyclohexylmercaptan (see Cyclohexanethiol)			
Cyclonite[†]	121-82-4 XY9450000	1.5 mg/m^3 TWA, 3 mg/m^3 STEL (skin)	Neurotoxicity

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Cyclopentadiene†	542-92-7 GY1000000	75 ppm (200 mg/m^3) TWA	Eye and nose irritation
Cyclopentane†	287-92-3 GY2390000	600 ppm (1,720 mg/m^3) TWA	CNS depression, skin irritation
Cyhexatin†,‡	13121-70-5 WH8750000	5 mg/m^3 TWA	Skin, eye, and respiratory irritation
2,4,-D† (dichlorophenoxyacetic acid)	94-75-7 AG6825000	10 mg/m^3 TWA	Skin irritation, CNS effects
DDT (dichlorodiphenyl-trichloroethane)	50-29-3 KJ3325000	Ca; 0.5 mg/m^3 TWA (0.1 mg/m^3 LOQ)	Potential for cancer; liver, lung, and lymphatic tumors in animals
Decaborane†	17702-41-9 HD1400000	0.05 ppm (0.3 mg/m^3) TWA (skin), 0.15 ppm (0.9 mg/m^3) STEL (skin)	Nervous system effects and narcosis; liver and kidney effects in animals
1-Decanethiol (decylmercaptan) *Class: Thiols*§	143-10-2 ††	0.5 ppm (3.6 mg/m^3) ceiling	Eye and skin irritation; blood and nervous system effects
Decylmercaptan (see 1-Decanethiol)			
Demeton†,‡ (Systox®)	8065-48-3 TF3150000	0.1 mg/m^3 TWA (skin)	Anticholinesterase agent

Di-2-ethylhexylphthalate** (DEHP) (di-sec-octylphthalate)	117-81-7 TI0350000	Ca; 5 mg/m^3 TWA, 10 mg/m^3 STEL (0.15 mg/m^3 LOQ)	Potential for cancer; liver tumors in animals
2,6-Di-tert-butyl-p-cresol†,‡	128-37-0 GO7875000	10 mg/m^3 TWA	Decreased growth rate and increased liver weight in animals
Diacetone alcohol‡ (4-hydroxy- 4-methyl-2-pentanone) *Class: Ketones*§	123-42-2 SA9100000	50 ppm (240 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
2,4-Diaminoanisole	615-05-4 BZ8580500	Ca; lowest feasible concentration	Potential for cancer; tumors of the thyroid, skin, and lymphatic system in animals
1,2-Diaminoethane (see Ethylenediamine)			
o-Dianisidine-based dyes	††	Ca; lowest feasible concentration	Potential for cancer; tumors of the bladder, stomach, and mammary glands in animals
Diazinon†,‡	333-41-5 TF3325000	0.1 mg/m^3 TWA (skin)	Skin and eye irritation, cholinesterase inhibition
Diazomethane†	334-88-3 PA7000000	0.2 ppm (0.4 mg/m^3) TWA	Severe respiratory irritation and sensitization, asthma attacks, eye and mucous membrane irritation

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Diborane†	19287-45-7 HQ9275000	0.1 ppm (0.1 mg/m^3) TWA	Pulmonary irritation; liver and kidney damage in animals
1,2-Dibromo-3-chloropropane‡ (DBCP)	96-12-8 TX8750000	Ca; use 29 CFR 1910.1044	Sterility; renal and liver effects; cancer of the nasal cavity, tongue, pharynx, lungs, stomach, adrenal glands, and mammary glands in animals
2-N-Dibutylaminoethanol† (DBAE)	102-81-8 KK3850000	2 ppm (14 mg/m^3) TWA (skin)	Acetylcholinesterase inhibition in vitro; weight loss in animals
Dibutyl phosphate†	107-66-4 TB9605000	1 ppm (5 mg/m^3) TWA, 2 ppm (10 mg/m^3) STEL	Respiratory irritation, headaches
Dibutyl phthalate†	84-74-2 TI0875000	5 mg/m^3 TWA	Heated compound is an irritant of the eyes and respiratory tract
1,3-Dichloro-5,5-dimethyl hydantoin†	118-52-5 MU0700000	0.2 mg/m^3 TWA, 0.4 mg/m^3 STEL	Eye and mucous membrane irritation
Dichloroacetylene†	7572-29-4 AP1080000	Ca; 0.1 ppm (0.4 mg/m^3) ceiling	Potential for cancer, neurotoxicity, CNS depression; kidney tumors in animals
o-Dichlorobenzene†,‡	95-50-1 CZ4500000	50 ppm (300 mg/m^3) ceiling	Upper respiratory and eye irritation; liver and kidney toxicity in animals

p-Dichlorobenzene[†,‡]	106-46-7 CZ4550000	Ca (1.7 ppm LOQ)	Potential for cancer, eye and upper respiratory irritation, liver toxicity; kidney and liver cancer in animals
3,3'-Dichlorobenzidine	91-94-1 DD0525000	Ca; use 29 CFR 1910.1007	Potential for cancer; bladder and liver cancer in animals
Dichlorodifluoromethane[†]	75-71-8 PA8200000	1,000 ppm (4,950 mg/m^3) TWA	Narcotic effects and possible asphyxia from vapor
1,1-Dichloroethane[†] (ethylidene chloride) *Class: Chloroethanes*[§]	75-34-3 KI0175000	100 ppm (400 mg/m^3) TWA	Narcotic effects from vapor; possible damage to the liver, kidneys, and lungs
1,2-Dichloroethylene[†]	540-59-0 KV9360000	200 ppm (790 mg/m^3) TWA	Narcotic effects, mucous membrane irritation
Dichloroethyl ether[†]	111-44-4 KN0875000	Ca; 5 ppm (30 mg/m^3) TWA (skin), 10 ppm (60 mg/m^3) STEL (skin)	Eye and respiratory irritation, pulmonary damage
Dichloromethane (see Methylene chloride)			
Dichloromonofluoromethane[†] (Refrigerant 21)	75-43-4 PA8400000	10 ppm (40 mg/m^3) TWA	Respiratory irritation, asphyxia at high concentrations
1,1-Dichloro-1-nitroethane[†]	594-72-9 KI1050000	2 ppm (10 mg/m^3) TWA	Vapor causes pulmonary, skin, and eye irritation in animals; also causes liver, kidney, and heart damage in animals

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
1,2-Dichloropropane (see Propylene dichloride)			
1,3-Dichloropropene[†,‡]	542-75-6 UC8310000	Ca; 1 ppm (5 mg/m^3) 8-hr TWA (skin)	Potential for cancer; cancer of the bladder, lung, and forestomach in animals
2,2-Dichloropropionic acid[†]	75-99-0 UF0690000	1 ppm (6 mg/m^3) TWA	Skin, eye, respiratory, and gastrointestinal irritation
Dichlorotetrafluoroethane[†] (Refrigerant 114)	76-14-2 KI1101000	1,000 ppm (7,000 mg/m^3) TWA	Respiratory irritation, asphyxia at high concentrations
Dichlorvos[†,‡] (DDVP)	62-73-7 TC0350000	1 mg/m^3 TWA (skin)	Cholinesterase inhibition
Dicrotophos[†,‡]	141-66-2 TC3850000	0.25 mg/m^3 TWA (skin)	Cholinesterase inhibition
Dicyclohexylmethane 4,4'-diisocyanate[**] [methylene bis(4-cyclohexyl-isocyanate)] *Class: Diisocyanates*[§]	5124-30-1 NQ9250000	0.01 ppm (0.11 mg/m^3) ceiling	Respiratory effects and sensitization, pulmonary irritation
Dicyclopentadiene[†]	77-73-6 PC1050000	5 ppm (30 mg/m^3) TWA	Skin and eye irritation

Dicyclopentadienyl iron[†] (ferrocene)	102-54-5 LK0700000		Mutagenesis in dogs
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Dieldrin[‡,**] (Aldrin/dieldrin)	60-57-1 IO1750000	Ca; 0.25 mg/m^3 TWA (skin) (0.15 mg/m^3 LOQ)	Potential for cancer; tumors of the lungs, liver, thyroid, and adrenal glands in animals
Diesel exhaust	[††] HZ1760000	Ca; lowest feasible concentration	Potential for cancer; tumors of the lungs in animals
Diethanolamine[†]	111-42-2 KL2975000	3 ppm (15 mg/m^3) TWA	Skin irritation, eye damage
Diethyl ether (see Ethyl ether)			
Diethyl ketone[†]	96-22-0 SA8050000	200 ppm (705 mg/m^3) TWA	Skin and eye irritation
Diethyl phthalate[†]	84-66-2 TI1050000	5 mg/m^3 TWA	Mild toxic effects; smaller than normal fetuses in animals
Diethylamine[†]	109-89-7 HZ8750000	10 ppm (30 mg/m^3) TWA, 25 ppm (75 mg/m^3) STEL	Eye, skin, and respiratory irritation; myocardial degeneration in animals
2-Diethylaminoethanol[†]	100-37-8 KK5075000	10 ppm (50 mg/m^3) TWA (skin)	Skin, eye, and respiratory irritation
Diethylene triamine[†]	111-40-0 IE1225000	1 ppm (4 mg/m^3) TWA (skin)	Skin and respiratory irritation and sensitization

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Difluorodibromomethane†	75-61-6 PA7525000	100 ppm (860 mg/m^3) TWA	Respiratory irritation and narcotic effects
Diglycidyl ether** (DGE) *Class: Glycidyl ethers*§	2238-07-5 KN2350000	Ca; 0.1 ppm (0.5 mg/m^3) TWA	Potential for cancer, skin and mucous membrane effects, potential for sensitization, possible hematopoietic and reproductive effects; skin tumors in animals
Dihydroxybenzene (see Hydroquinone)			
Diisobutyl ketone‡ (2,6-dimethyl-4-heptanone) *Class: Ketones*§	108-83-8 MJ5775000	25 ppm (150 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Diisocyanates§	††	See individual chemical	
Diisopropylamine†	108-18-9 IM4025000	5 ppm (20 mg/m^3) TWA (skin)	Respiratory and severe eye irritation
Dimethoxymethane (see Methylal)			
Dimethyl acetamide†	127-19-5 AB7700000	10 ppm (35 mg/m^3) TWA (skin)	Liver damage
Dimethylamine†	124-40-3 IP8750000	10 ppm (18 mg/m^3) TWA	Gas produces respiratory, eye, and mucous membrane irritation in animals
4-Dimethylaminoazobenzene	60-11-7 BX7350000	Ca; use 29 CFR 1910.1015	Potential for cancer; tumors of the liver and bladder in animals

Dimethylaminobenzene (see Xylidine)			
Dimethylaminopropionitrile *Class: NIAX® catalyst ESN*[§]	1738-25-6 UG1575000	Minimize exposure to NIAX® catalyst ESN	Urological disorders, nervous system effects
Dimethylaniline[†] (N,N-dimethylaniline)	121-69-7 BX4275000	5 ppm (25 mg/m^3) TWA (skin), 10 ppm (50 mg/m^3) STEL (skin)	Anoxia resulting from the formation of methemoglobin
Dimethylbenzene (see Xylene)			
Dimethylcarbamoylchloride	79-44-7 FD4200000	Ca; lowest feasible concentration	Potential for cancer; nasal cancer found in animals
Dimethyl-1,2-dibromo-2, 2-dichloroethyl phosphate[†] (naled)	300-76-5 TB9450000	3 mg/m^3 TWA (skin)	Cholinesterase inhibition
Dimethylformamide[†]	68-12-2 LQ2100000	10 ppm (30 mg/m^3) TWA (skin)	Vapors are toxic to the liver
2,6-Dimethyl-4-heptanone (see Diisobutyl ketone)			
1,1-Dimethylhydrazine *Class: Hydrazines*[§]	57-14-7 MV2450000	Ca; 0.06 ppm (0.15 mg/m^3) ceiling (120-min)	Potential for cancer; blood, liver, and skin effects; tumors of the lungs, liver, blood vessels, and intestines in animals

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
bis[2-(Dimethylaminoethyl) ether] *Class: NIAX® catalyst ESN*[§]	3033-62-3 KR9460000	Minimize exposure to NIAX® catalyst ESN	Urological disorders, nervous system effects
Dimethylphthalate[†,‡]	131-11-3 TI1575000	5 mg/m^3 TWA	Heated compound causes eye and upper respiratory irritation
Dimethyl sulfate[†]	77-78-1 WS8225000	Ca; 0.1 ppm (0.5 mg/m^3) 8-hr TWA (skin)	Potential for cancer, severe irritation of the eyes, mucous membranes, and skin; nasal and lung cancer in animals
Dinitrolmide[†] (3,5-dinitro-o-toluamide)	148-01-6 XS4200000	5 mg/m^3 TWA	Hepatic changes
Dinitro-o-cresol[**]	534-52-1 GO9625000	0.2 mg/m^3 TWA (skin)	CNS and metabolic effects
Dinitrobenzene[†] (all isomers)		1 mg/m^3 TWA (skin)	Anoxia resulting from the formation of methemoglobin, liver damage
meta	99-65-0 CZ7350000		
ortho	528-29-0 CZ7450000		
para	100-25-4 CZ7525000		
Dinitrotoluenes[§,**]	25321-14-6 XT1300000	Ca; 1.5 mg/m^3 TWA (skin)	Potential for cancer; reproductive effects; tumors of the liver, skin, and kidneys in animals

Dioxane (diethylene dioxide)	123-91-1 JG8225000	Ca; 1 ppm (3.6 mg/m^3) ceiling (30-min)	Potential for cancer; liver and kidney effects; liver, lung, and nasal cavity tumors in animals
Dioxathion[†,‡] (Delnav)	78-34-2 TE3350000	0.2 mg/m^3 TWA (skin)	Cholinesterase inhibition
Diphenyl[†,‡] (biphenyl)	92-52-4 DU8050000	0.2 ppm (1 mg/m^3) TWA	Eye and throat irritation, liver and CNS damage
Diphenylamine[†,‡]	122-39-4 JJ7800000	10 mg/m^3 TWA	Skin, eye, and mucous membrane irritation; urinary and teratogenic effects in animals
Diphenylmethane diisocyanate (see Methylene bisphenyl isocyanate)			
Dipropylene glycol methyl ether[†]	34590-94-8 JM1575000	100 ppm (600 mg/m^3) TWA (skin), 150 ppm (900 mg/m^3) STEL (skin)	Narcotic effects, mild irritation of the nose and eyes
Dipropyl ketone[†]	123-19-3 MJ5600000	50 ppm (235 mg/m^3) TWA	Mild toxicity; liver effects at high concentrations in animals
Diquat[†]	85-00-7 JM5690000	0.5 mg/m^3 TWA	CNS effects, skin and respiratory irritation from mists or dusts
Disulfiram[†]	97-77-8 JO1225000	2 mg/m^3 TWA	Inhibition of cytochrome P450, d-amino acid oxidase, and aldehyde dehydrogenase

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Disulfoton[†,‡]	298-04-4 TD9275000	0.1 mg/m^3 TWA (skin)	Cholinesterase inhibition
Diuron[†]	330-54-1 YS8925000	10 mg/m^3 TWA	Respiratory irritation
Divinyl benzene[†]	1321-74-0 CZ9450000	10 ppm (50 mg/m^3) TWA	Mild skin, eye, and respiratory irritation; skin burns with prolonged contact
Dodecylmercaptan (see 1-Dodecanethiol)			
1-Dodecanethiol (dodecylmercaptan) *Class: Thiols*[§]	112-55-0 JR3155000	0.5 ppm (4.1 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects
Emery (see Appendix III)	12415-34-8 ††		
Endosulfan[†,‡]	115-29-7 RB9275000	0.1 mg/m^3 TWA (skin)	Convulsions; high toxicity in female animals
Endrin[†,‡]	72-20-8 IO575000	0.1 mg/m^3 TWA (skin)	Convulsions
Enflurane *Class: Waste anesthetic gases and vapors*[§]	13838-16-9 KN6800000	2 ppm (15.1 mg/m^3) ceiling (60-min)	Reproductive effects and decreased audio-visual performance

Epichlorohydrin[‡] (1-chloro-2,3-epoxypropane)	106-89-8 TX4900000	Ca; lowest feasible concentration (2.5 mg/m^3 LOQ)	Respiratory cancer; mutagenesis; reproductive, skin, kidney, liver, and respiratory effects
EPN[†,‡]	2104-64-5 TB1925000	0.5 mg/m^3 TWA (skin)	Cholinesterase inhibition
1,2-Epoxypropane (see Propylene oxide)			
2,3-Epoxy-1-propanol (see Glycidol)			
Ethanethiol (ethyl mercaptan) *Class: Thiols*[§]	75-08-1 KI9625000	0.5 ppm (1.3 mg/m^3) ceiling	Skin and eye irritation, blood and nervous system effects
Ethanolamine[†,‡]	141-43-5 KJ5775000	3 ppm (8 mg/m^3) TWA, 6 ppm (15 mg/m^3) STEL	Skin, eye, and respiratory irritation; narcotic effects
Ethion[†,‡]	563-12-2 TE4550000	0.4 mg/m^3 TWA (skin)	Cholinesterase inhibition; toxic effects on nervous, respiratory, and digestive systems
2-Ethoxyethanol (see Ethylene glycol monoethyl ether)			
2-Ethoxyethyl acetate (see Ethylene glycol monoethyl ether acetate)			
Ethyl acetate[†,‡]	141-78-6 AH542500	400 ppm (1,400 mg/m^3) TWA	Eye and respiratory irritation

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Ethyl acrylate†	140-88-5 AT0700000	Ca (4.0 ppm LOQ)	Potential for cancer; tumors of the forestomach in animals
Ethyl alcohol† (ethanol)	64-17-5 KQ6300000	1,000 ppm (1,900 mg/m^3) TWA	Eye, respiratory, and skin irritation; teratogenic and reproductive effects
Ethylamine†	75-04-7 KH2100000	10 ppm (18 mg/m^3) TWA	Primary irritation of mucous membranes, eyes, and skin
Ethyl amyl ketone† (5-methyl-3-heptanone)	541-85-5 MJ7350000	25 ppm (130 mg/m^3) TWA	Primary irritation of skin and eyes, CNS depression
Ethyl benzene†	100-41-4 DA0700000	100 ppm (435 mg/m^3) TWA, 125 ppm (545 mg/m^3) STEL	Eye, skin, and upper respiratory irritation
Ethyl bromide (see Appendix III)			
Ethyl butyl ketone† (3-heptanone)	106-35-4 MJ5250000	50 ppm (230 mg/m^3) TWA	Skin and respiratory irritation
Ethyl chloride (see Monochloroethane)			
Ethyl ether (see Appendix III)	74-96-4 KH6475000		
Ethyl formate†,‡	109-94-4 LQ8400000	100 ppm (300 mg/m^3) TWA	Eye and nose irritation; narcosis in animals at high concentrations

Ethyl mercaptan (see Ethanethiol)			
Ethyl silicate†	78-10-4 VV9450000	10 ppm (85 mg/m^3) TWA	Eye and nose irritation; lung, liver, and kidney damage in animals
Ethylene chlorohydrin† (2-chloroethanol)	107-07-3 KK0875000	1 ppm (3 mg/m^3) ceiling (skin)	Eye, nose, and respiratory irritation; liver, kidney, and brain toxicity
Ethylenediamine†,‡ (1,2-diaminoethane)	107-15-3 KH8575000	10 ppm (25 mg/m^3) TWA	Sensitization and primary irritation to the skin, mucous membranes, and respiratory tract
Ethylene dibromide‡	106-93-4 KH9275000	Ca; 0.045 ppm TWA, 0.13 ppm ceiling (15-min)	Potential for cancer; mutagenesis; damage to skin, eyes, heart, liver, spleen, CNS, and reproductive and respiratory systems
Ethylene dichloride‡,••	107-06-2 KI0525000	Ca; 1 ppm (4 mg/m^3) TWA, 2 ppm (8 mg/m^3) STEL	Potential for cancer; nervous system, respiratory, cardiovascular, and liver effects
Ethylene glycol‡ (see Appendix III)	107-21-1 KW2975000		
Ethylene glycol dinitrate••	628-96-6 KW5600000	0.1 mg/m^3 STEL (skin)	Circulatory system effects
Ethylene glycol monobutyl ether (EGBE) (2-butoxyethanol) *Class: Glycol ethers*§	111-76-2 KJ8575000	5 ppm (24 mg/m^3) TWA (skin)	Adverse effects on blood and hematopoietic system, tissue irritation, CNS depression

•Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
••REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Ethylene glycol monobutyl ether acetate (EGBEA) (2-butoxyethyl acetate) *Class: Glycol ethers*§	112-07-2 KJ8925000	5 ppm (33 mg/m^3) TWA (skin)	Adverse effects on blood and hematopoietic system, tissue irritation, CNS depression
Ethylene glycol monoethyl ether (EGEE) (2-ethoxyethanol) *Class: Glycol ethers*§	110-80-5 KK8050000	0.5 ppm (1.8 mg/m^3) TWA (skin)	Reproductive and developmental effects; blood, CNS, and hematopoietic system effects
Ethylene glycol monoethyl ether acetate (EGEEA) (2-ethoxyethyl acetate) *Class: Glycol ethers*§	111-15-9 KK8225000	0.5 ppm (2.7 mg/m^3) TWA (skin)	Reproductive and developmental effects; blood, CNS, and hematopoietic system effects
Ethylene glycol monomethyl ether (EGME) (2-methoxyethanol) *Class: Glycol ethers*§	109-86-4 KL5775000	0.1 ppm (0.3 mg/m^3) TWA (skin)	Reproductive and developmental effects; blood, CNS, and hematopoietic system effects
Ethylene glycol monomethyl ether acetate (EGMEA) (2-methoxyethyl acetate) *Class: Glycol ethers*§	110-49-6 KL5950000	0.1 ppm (0.5 mg/m^3) TWA (skin)	Reproductive and developmental effects; blood, CNS, and hematopoietic system effects
Ethylene oxide‡	75-21-8 KX2450000	Ca; 0.1 ppm (0.18 mg/m^3) 8-hr TWA, 5 ppm (9 mg/m^3) ceiling (10-min)	Peritoneal cancer, leukemia, mutagenesis, reproductive effects

Ethyleneimine	151-56-4 KX5075000	Ca; use 29 CFR 1910.1012	Potential for cancer; liver and lung tumors in animals
Ethylene thiourea	96-45-7 NI9625000	Ca; use in encapsulated form in industry; lowest feasible concentration	Potential for cancer and teratogenesis; liver, thyroid, and lymphatic system tumors in animals
Ethylidene chloride (see 1,1-Dichloroethane)			
Ethylidene norbornene[†] (ENB)	16219-75-3 RB9450000	5 ppm (25 mg/m^3) ceiling	Eye and skin irritation; kidney, renal, urogenital, and bone marrow effects in animals
N-Ethylmorpholine[†]	100-74-3 QE4025000	5 ppm (23 mg/m^3) TWA (skin)	Visual disturbances, mucous membrane irritation
Fenamiphos[†]	22224-92-6 TB3675000	0.1 mg/m^3 TWA (skin)	Cholinesterase inhibition
Fensulfothion[†,‡] (Dasanit)	115-90-2 TF3850000	0.1 mg/m^3 TWA	Cholinesterase inhibition, skin irritation
Fenthion[‡] (see Appendix III)	55-38-9 TF9625000		
Ferbam[†,‡]	14484-64-1 NO8750000	10 mg/m^3 TWA	Eye and respiratory irritation from dust

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Ferrovanadium dust** *Class: Vanadium*§	12604-58-9 LK2900000	1 mg/m^3 TWA, 3 mg/m^3 STEL	Eye, skin, and lung effects
Fibrous glass *Class: Synthetic vitreous fibers*§	†† LK3651000	3 million fibers/m^3 TWA (fibers $\leq$3.5 μm in diameter and $\geq$10 μm long); 5 mg/m^3 TWA (total fibrous glass)	Eye, skin, and respiratory effects
Fluorides, inorganic§	††	2.5 mg/m^3 TWA	Kidney and bone effects
Fluorine†	7782-41-4 LM6475000	0.1 ppm (0.2 mg/m^3) TWA	Severe irritation of the eyes, mucous membranes, and skin; lung damage
Fluorotrichloromethane† (trichlorofluoromethane)	75-69-4 PB6125000	1,000 ppm (5,600 mg/m^3) ceiling	Narcotic effects; asphyxia at high concentrations
Fluroxene *Class: Waste anesthetic gases and vapors*§	406-90-6 KO4250000	2 ppm (10.3 mg/m^3) ceiling (60-min)	Reproductive effects and decreased audiovisual performance
Fonofos†,‡	944-22-9 TA5950000	0.1 mg/m^3 TWA (skin)	Cholinesterase inhibition
Formaldehyde‡	50-00-0 LP8925000	Ca; 0.016 ppm 8-hr TWA, 0.1 ppm ceiling (15-min)	Nasal cancer
Formamide†	75-12-7 LQ0525000	10 ppm (15 mg/m^3) TWA (skin)	Skin, eye, and mucous membrane irritation; reproductive effects in animals

Formic acid†	64-18-6 LQ4900000	5 ppm (9 mg/m³) TWA	Severe irritation of the eyes, mucous membranes, upper respiratory tract, and skin
Furfural (see Appendix III)	98-01-1 LT7000000		
Furfuryl alcohol**	98-00-0 LU9100000	10 ppm (40 mg/m³) TWA (skin), 15 ppm (60 mg/m³) STEL (skin)	Respiratory effects
Gallium arsenide	1303-00-0 LW8800000	Ca; 0.002 mg As/m³ ceiling (15-min)	Lung and lymphatic cancer resulting from dissociation of gallium arsenide to arsenic
Gasoline†	8006-61-9 LX3300000	Ca (15 ppm LOQ)	Potential for cancer; skin and eye irritation; kidney and liver cancer in animals
Germanium tetrahydride†	7782-65-2 LY4900000	0.2 ppm (0.6 mg/m³) TWA	Toxic effects; flammable gas may cause burns
Glutaraldehyde†‡	111-30-8 MA2450000	0.2 ppm (0.8 mg/m³) ceiling	Mutagenesis; possible teratogenesis; eye, nose, and throat irritation
Glycerin (see Appendix III)	56-81-5 MA8050000		
Glycidol† (2,3-epoxy-1-propanol)	556-52-5 UB4375000	25 ppm (75 mg/m³) TWA	Eye, upper respiratory, and skin irritation; CNS depression

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Glycidyl ethers§	††	See individual chemical	
Glycol ethers§	††	See individual chemical	
Glycolonitrile *Class: Nitriles*§	107-16-4 AM0350000	2.0 ppm (5.0 mg/m^3) ceiling (15-min)	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Grain dust†	††	4 mg/m^3 TWA	Chronic bronchitis, asthma, and chronic obstructive pulmonary disease
Graphite,† natural respirable dust	7782-42-5 MD9659600	2.5 mg/m^3 TWA	Graphite pneumoconiosis
Graphite, synthetic (see Appendix III)	††		
Guthion● (see Azinphos-methyl)			
Gypsum†	13397-24-5 MG2360000		Eye, skin, and physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Hafnium†	7440-58-6 MG4600000	0.5 mg/m^3 TWA	Liver damage and eye and skin irritation in animals

Halothane *Class: Waste anesthetic gases and vapors*[§]	151-67-7 KH6550000	2 ppm (16.2 mg/m^3) ceiling (60-min)	Reproductive effects and decreased audiovisual performance
Heptachlor[†,‡]	76-44-8 PC0700000	Ca; 0.5 mg/m^3 TWA (skin)	Potential for cancer; liver tumors in animals
Heptane *Class: Alkanes*[§]	142-82-5 MI7700000	85 ppm (350 mg/m^3) TWA, 440 ppm (1,800 mg/m^3) ceiling (15-min)	Skin and nervous system effects
1-Heptanethiol (n-heptyl-mercaptan) *Class: Thiols*[§]	1639-09-4 MJ1400000	0.5 ppm (2.7 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects
n-Heptylmercaptan (see 1-Heptanethiol)			
Hexachlorobutadiene[†]	87-68-3 EJ0700000	Ca; 0.02 ppm (0.24 mg/m^3) TWA (skin)	Potential for cancer; kidney tumors in animals
Hexachlorocyclopentadiene[†,‡]	77-47-4 GY1225000	0.01 ppm (0.1 mg/m^3) TWA	Mucous membrane and skin irritation
Hexachloroethane[‡,••] *Class: Chloroethanes*	67-72-1 KI4025000	Ca; 1 ppm (10 mg/m^3) 8-hr TWA	Potential for cancer; liver tumors in animals
Hexachloronaphthalene[†] (Halowax 1014)	1335-87-1 QJ3500000	0.2 mg/m^3 TWA (skin)	Toxic effects on liver and skin

[•]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[••]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
1-Hexadecanethiol (cetylmercaptan) *Class: Thiols*§	2917-26-2 ††	0.5 ppm (5.3 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects
Hexafluoroacetone†	684-16-2 UC2450000	0.1 ppm (0.7 mg/m^3) TWA (skin)	Severe lung irritation; eye, nose, throat, and skin irritation. In animals, damage to the liver, kidneys, thymus, spleen, lungs, lymph nodes, and testes; fetotoxic, embryotoxic, and teratogenic effects
Hexamethylphosphoric triamide (HMPA)	680-31-9 TD0875000	Ca; lowest feasible concentration	
Hexamethylene diisocyanate (HDI) *Class: Diisocyanates*§	822-06-0 MO1740000	0.035 mg/m^3 TWA, 0.14 mg/m^3 ceiling (10-min)	Respiratory effects, sensitization, and pulmonary irritation
Hexane** *Class: Alkanes*§	110-54-3 MN9275000	50 ppm (180 mg/m^3) TWA	Skin and nervous system effects
Hexane isomers *Class: Alkanes*§	†† MO3860000	100 ppm (350 mg/m^3) TWA, 510 ppm (1,800 mg/m^3) ceiling	Skin and nervous system effects
l-Hexanethiol (n-hexylmercaptan) *Class: Thiols*§	111-31-9 MO4550000	0.5 ppm (2.7 mg/m^3) ceiling	Eye and skin irritation, blood and nervous system effects

2-Hexanone (see Methyl butyl ketone)			
Hexone (see Methyl isobutyl ketone)			
sec-Hexyl acetate†	108-84-9 SA7525000	50 ppm (300 mg/m^3) TWA	Mild eye and upper respiratory irritation
Hexylene glycol†	107-41-5 SA0810000	25 ppm (125 mg/m^3) ceiling	CNS depression; eye, skin, throat, and respiratory irritation; liver and kidney damage in animals
n-Hexylmercaptan (see 1-Hexanethiol)			
Hydrazines§	302-01-2 MU7175000	Ca; 0.03 ppm (0.04 mg/m^3) ceiling (120-min)	Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals
Hydrogen bromide†	10035-10-6 MW3850000	3 ppm (10 mg/m^3) ceiling	Eye, mucous membrane, and skin irritation
Hydrogen chloride†,‡	7647-01-0 MW4025000	5 ppm (7 mg/m^3) ceiling	Eye, mucous membrane, and skin irritation
Hydrogen cyanide** *Class: Hydrogen cyanide and cyanide salts*§	74-90-8 MW6825000	4.7 ppm (5 mg/m^3) STEL (skin)	Thyroid, blood, and respiratory effects

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Hydrogen fluoride**	7664-39-3 MW7875000	3 ppm (2.5 mg/m^3) TWA, 6 ppm (5.0 mg/m^3) STEL	Skin, eye, and airway irritation; bone effects
Hydrogen peroxide†	7722-84-1 MX0900000	1.0 ppm (1.4 mg/m^3) TWA	Eye, mucous membrane, and skin irritation
Hydrogen selenide†	7783-07-5 MX1050000	0.05 ppm (0.2 mg/m^3) TWA	Eye, nose, and throat irritation; pulmonary irritation in animals
Hydrogen sulfide	7783-06-4 MX1225000	10 ppm (15 mg/m^3) ceiling (10-min)	Irritation and severe acute effects on nervous and respiratory systems
Hydrogenated terphenyls†	61788-32-7 WZ6535000	0.5 ppm (5 mg/m^3) TWA	Eye, skin, and lung damage; systemic toxicity to the liver, kidneys, and blood-forming organs
Hydroquinone (dihydroxybenzene)	123-31-9 MX3500000	2 mg/m^3 ceiling (15-min)	Eye and skin effects
2-Hydroxypropyl acrylate†	999-61-1 AT1925000	0.5 ppm (3 mg/m^3) TWA (skin)	Skin and eye irritation
Indene†	95-13-6 NK8225000	10 ppm (45 mg/m^3) TWA	Mucous membrane and lung irritation; in animals, liver and renal necrosis, spleen injury
Indium and compounds† (as I)	7440-74-6 NL1050000	0.1 mg/m^3 TWA	Highly toxic effects; eye and respiratory irritation

Iodine[†,‡]	7553-56-2 NN1575000	0.1 ppm (1 mg/m^3) ceiling	Severe eye, respiratory, and skin irritation
Iodoform[†]	75-47-8 PB7000000	0.6 ppm (10 mg/m^3) TWA	CNS depression; eye, heart, liver, and kidney damage
Iron oxide,[†] dust and fume (as Fe, total particulate)	1309-37-1 NO7400000	5 mg/m^3 TWA	Benign pneumoconiosis termed siderosis
Iron pentacarbonyl[†] (as Fe)	13463-40-6 NO4900000	0.1 ppm (0.8 mg/m^3) TWA, 0.2 ppm (1.6 mg/m^3) STEL	Lung effects, degenerative changes in CNS
Iron salts[†], soluble	[††]	1.0 mg/m^3 TWA	Skin and mucous membrane irritation
Isoamyl acetate[†]	123-92-2 NS9800000	100 ppm (525 mg/m^3) TWA	Conjunctival and upper respiratory irritation, narcosis
Isoamyl alcohol[†]		100 ppm (360 mg/m^3) TWA, 125 ppm (450 mg/m^3) STEL	Mild irritation of the eyes, respiratory tract, and skin
Primary	123-51-3 EL5425000		
Secondary	6032-29-7 SA4900000		
Isobutyl acetate[†]	110-19-0 AI4025000	150 ppm (700 mg/m^3) TWA	Eye and nose irritation, narcosis
Isobutyl alcohol[†]	78-83-1 NP9625000	50 ppm (150 mg/m^3) TWA	Narcotic effects; mild irritation of the skin, eyes, and throat

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Isobutyronitrile *Class: Nitriles*§	78-82-0 TZ4900000	8 ppm (22 mg/m^3) TWA	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Isooctyl alcohol†	26952-21-6 NS7700000	50 ppm (270 mg/m^3) TWA (skin)	Conjunctival irritation in animals
Isophorone‡ *Class: Ketones*§	78-59-1 GW7700000	4 ppm (23 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Isophorone diisocyanate** *Class: Diisocyanates*§	4098-71-9 NQ9370000	0.005 ppm (0.045 mg/m^3) TWA (skin), 0.02 ppm (0.18 mg/m^3) STEL (skin)	Respiratory effects, sensitization, pulmonary irritation
2-Isopropoxyethanol (see Appendix III)	109-59-1 KL5075000		
Isopropyl acetate (see Appendix III)	108-21-4 AI4930000		
Isopropyl alcohol**	67-63-0 NT8050000	400 ppm (980 mg/m^3) TWA, 500 ppm (1,225 mg/m^3) STEL	Mucous membrane irritation, possible carcinogenic effects
Isopropyl ether†	108-20-3 TZ5425000	500 ppm (2,100 mg/m^3) TWA	Mild irritation of the eyes and mucous membranes, narcosis in animals
Isopropyl glycidyl ether (IGE) *Class: Glycidyl ethers*§	4016-14-2 TZ3500000	50 ppm (240 mg/m^3) ceiling	Skin and mucous membrane effects, sensitization potential, possible hematopoietic and reproductive effects

Isopropylamine (see Appendix III)	75-31-0 NT8400000		
N-Isopropylaniline†	768-52-5 BY4200000	2 ppm (10 mg/m^3) TWA (skin)	Skin and eye irritation in animals
Kaolin†	1332-58-7		Skin and mucous membrane injury, respiratory effects
Total dust	††	10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Kepone	143-50-0 PC8575000	Ca; 0.001 mg/m^3 TWA	Liver cancer, nervous system effects
Kerosene *Class: Refined petroleum solvents*§	8008-20-6 OA5500000	100 mg/m^3 TWA	Eye, nose, and throat irritation; dermatitis; nervous system effects
Ketene†	463-51-4 OA7700000	0.5 ppm (0.9 mg/m^3) TWA, 1.5 ppm (3 mg/m^3) STEL	Severe respiratory irritation; lung damage in animals
Ketones§	††	See individual chemical	
Lead, inorganic§ (as Pb)	7439-92-1 OF7525000	<0.1 mg Pb/m^3 TWA; Pb concentration in air to be maintained so that Pb concentration in worker's blood remains ≤ 0.060 mg/100 g of whole blood	Kidney, blood, and nervous system effects

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Limestone†	1317-65-3 EV9580000		Eye and skin irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Lindane†	58-89-9 GV4900000	0.5 mg/m^3 8-hr TWA (skin)	Convulsions; liver and kidney damage in animals
Liquified petroleum gas†	68476-85-7 SE7545000	1,000 ppm (1,800 mg/m^3) TWA	Asphyxia, CNS depression
Lithium hydride†	7580-67-8 OJ6300000	0.025 mg/m^3 TWA	Severe irritation of the eyes, respiratory tract, and skin
Magnesite†	546-93-0 OM2470000		Skin, mucous membrane, and other physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Magnesium oxide fume (see Appendix III)			
Malathion‡,**	121-75-5 WM8400000	10 mg/m^3 TWA (skin)	Nervous system effects
Maleic anhydride†	108-31-6 ON3675000	0.25 ppm (1.0 mg/m^3) TWA	Severe eye irritation, skin and respiratory irritation, and sensitization

Malonaldehyde *Class: Aldehydes*[§]	542-78-9 TX6475000	Ca; lowest feasible concentration	Potential for cancer; thyroid gland tumors in animals; eye, skin, and respiratory irritation
Malononitrile *Class: Nitriles*[§]	109-77-3 OO3150000	3 ppm (8 mg/m^3) TWA	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Manganese compounds and fumes[†] (as Mn)	7439-96-5 OO9275000	1 mg/m^3 TWA, 3 mg/m^3 STEL	CNS effects, manganese pneumonitis
Manganese cyclopentadienyl tricarbonyl[†] (as Mn)	12079-65-1 OO9720000	0.1 mg/m^3 TWA (skin)	Tissue irritation and strong toxic effects
Manganese tetroxide (see Appendix III)	1317-35-7 OP0895000		
Marble[†]	1317-65-3 EV9580000		Physical irritation
Total dust Respirable fraction		10 mg/m^3 TWA 5 mg/m^3 TWA	
Mercury,[**] aryl and inorganic (as Hg) *Class: Mercury compounds*[§]	††	0.1 mg/m^3 ceiling (skin)	CNS and mental effects
Mercury (organo) alkyl compounds[†,‡] (as Hg)	††	0.01 mg/m^3 TWA, 0.03 mg/m^3 STEL (skin)	CNS damage; eye, respiratory, and skin irritation
Mercury[**] vapor (as Hg)	7439-97-6 OV4550000	0.05 mg/m^3 TWA (skin)	CNS damage; eye, respiratory, and skin irritation

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Mesityl oxide *Class: Ketones*[§]	141-79-7 SB4200000	10 ppm (40 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Methacrylic acid[†]	79-41-4 OZ2975000	20 ppm (70 mg/m^3) TWA (skin)	Severe eye and skin irritation
Methanethiol (methyl mercaptan) *Class: Thiols*[§]	74-93-1 PB4375000	0.5 ppm (1 mg/m^3) ceiling (15-min)	Irritation; eye, skin, blood, and nervous system effects
Methomyl[†,‡] (Lannate)	16752-77-5 AK2975000	2.5 mg/m^3 TWA	Reversible cholinesterase inhibition; eye irritation; kidney, liver, blood, spleen, and bone marrow effects
Methoxychlor[†,‡]	72-43-5 KJ3675000	Ca (0.07 mg/m^3 LOQ)	Potential for cancer; liver and ovarian cancers in animals
2-Methoxyethanol (see Ethylene glycol monomethyl ether)			
2-Methoxyethyl acetate (see Ethylene glycol monomethyl ether acetate)			
Methoxyflurane *Class: Waste anesthetic gases and vapors*[§]	76-38-0 KN7820000	2 ppm (13.5 mg/m^3) ceiling	Reproductive effects and decreased audiovisual performance

4-Methoxyphenol†	150-76-5 SL7700000	5 mg/m^3 TWA	Eye and skin irritation, corneal damage, CNS depression
Methyl acetate†	79-20-9 AI9100000	200 ppm (610 mg/m^3) TWA, 250 ppm (760 mg/m^3) STEL	Mild irritation to upper respiratory tract and eyes at higher concentrations
Methyl acetylene† (propyne)	74-99-7 UK4920000	1,000 ppm (1,650 mg/m^3) TWA	CNS effects
Methyl acetylene-propadiene mixture† (MAPP)	59355-75-8 UK4920000	1,000 ppm (1,800 mg/m^3) TWA, 1,250 ppm (2,250 mg/m^3) STEL	Anesthetic effects at high concentrations
Methyl acrylate†	96-33-3 AT2800000	10 ppm (35 mg/m^3) TWA (skin)	Conjunctival and upper respiratory irritation
Methyl alcohol**	67-56-1 PC1400000	200 ppm (260 mg/m^3) TWA (skin), 250 ppm (325 mg/m^3) STEL (skin)	Blindness, metabolic acidosis
Methylamine†	74-89-5 PF6300000	10 ppm (12 mg/m^3) TWA	Severe eye and respiratory irritation
Methyl amyl alcohol (see Methyl isobutyl carbinol)			
Methyl amyl ketone *Class: Ketones*§	110-43-0 MJ5075000	100 ppm (465 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Methyl bromide‡ *Class: Monohalomethanes*§	74-83-9 PA49000000	Ca; lowest feasible concentration (4.7 ppm LOQ)	Potential for cancer; tumors of the kidney, forestomach, and lung in animals
Methyl butyl ketone (2-hexanone) *Class: Ketones*§	591-78-6 MP1400000	1 ppm (4 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Methyl chloride *Class: Monohalomethanes*§	74-87-3 PA6300000	Ca; lowest feasible concentration (1.6 ppm LOQ)	Potential for cancer, possible teratogenic effects; tumors of the kidney, forestomach, and lung in animals
Methyl chloroform (see 1,1,1-Trichloroethane)			
Methyl chloromethyl ether (see Chloromethyl methyl ether)			
Methyl 2-cyanoacrylate†	137-05-3 AS7000000	2 ppm (8 mg/m^3) TWA, 4 ppm (16 mg/m^3) STEL	Nasal and eye irritation
Methyl demeton†	8022-00-2 TG1760000	0.5 mg/m^3 TWA (skin)	Cholinesterase inhibition, alteration of intraocular pressure
Methyl ethyl ketone** (MEK) (2-butanone) *Class: Ketones*§	78-93-3 EL6475000	200 ppm (590 mg/m^3) TWA, 300 ppm (885 mg/m^3) STEL	Irritation; liver, kidney, and nervous system effects

Methyl ethyl ketone peroxide[†] (MEKP)	1338-23-4 EL9450000	0.2 ppm (1.5 mg/m^3) ceiling	Eye and skin irritation; lung, liver, and kidney damage
Methyl formate[†]	107-31-3 LQ8925000	100 ppm (250 mg/m^3) TWA, 150 ppm (375 mg/m^3) STEL	Eye and respiratory irritation; narcosis in animals
Methylhydrazine (monomethylhydrazine) *Class: Hydrazines*[§]	60-34-4 MV5600000	Ca; 0.04 ppm (0.08 mg/m^3) ceiling (120-min)	Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals
Methyl iodide[••] *Class: Monohalomethanes*[§]	74-88-4 PA9450000	Ca; 2 ppm (10 mg/m^3) TWA (skin) (1.7 ppm LOQ)	Potential for cancer; tumors of the kidney, forestomach, and lung in animals
Methyl isoamyl ketone *Class: Ketones*[§]	110-12-3 MP3850000	50 ppm (240 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Methyl isobutyl carbinol[†] (methyl amyl alcohol)	108-11-2 SA7350000	25 ppm (100 mg/m^3) TWA (skin), 40 ppm (165 mg/m^3) STEL (skin)	Narcosis; eye irritation
Methyl isobutyl ketone[••] (hexone) *Class: Ketones*[§]	108-10-1 SA9275000	50 ppm (205 mg/m^3) TWA, 75 ppm (300 mg/m^3) STEL	Irritation; liver, kidney, and nervous system effects
Methyl isocyanate[†]	624-83-9 NQ9450000	0.02 ppm (0.05 mg/m^3) TWA (skin)	Lacrimation and irritation of the eyes, mucous membranes, and skin

[•]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[••]REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Methyl isopropyl ketone†	563-80-4 EL9100000	200 ppm (705 mg/m^3) TWA	Mild skin and eye irritation
Methyl mercaptan (see Methanethiol)			
Methyl methacrylate†	80-62-6 OZ5075000	100 ppm (410 mg/m^3) TWA	Respiratory irritation
Methyl parathion‡,**	298-00-0 TG0175000	0.2 mg/m^3 TWA (skin)	CNS effects
Methyl propyl ketone (2-pentanone) *Class: Ketones*§	107-87-9 SA7875000	150 ppm (530 mg/m^3) TWA	Irritation; liver, kidney, and nervous system effects
Methyl silicate†	681-84-5 VV9800000	1 ppm (6 mg/m^3) TWA	Severe eye irritation
Methylacrylonitrile†	126-98-7 UD1400000	1 ppm (3 mg/m^3) TWA (skin)	CNS effects in animals
Methylal† (dimethoxymethane)	109-87-5 PA8750000	1,000 ppm (3,100 mg/m^3) TWA	Mild respiratory irritation and anesthetic effects
α-Methyl styrene†	98-83-9 WL5075300	50 ppm (240 mg/m^3) TWA, 100 ppm (485 mg/m^3) STEL	Slight irritation of the eyes, upper respiratory tract, and skin; CNS depression

Methylcyclohexane†	108-87-2 GV6125000	400 ppm (1,600 mg/m^3) TWA	Mild narcotic effects
Methylcyclohexanol†	25639-42-3 GW0175000	50 ppm (235 mg/m^3) TWA	Mild irritation of the eyes and mucous membranes in animals
o-Methylcyclohexanone†	583-60-8 GV1750000	50 ppm (230 mg/m^3) TWA (skin), 75 ppm (345 mg/m^3) STEL (skin)	Eye and mucous membrane irritation in animals, narcosis at high concentrations
Methylcyclopentadienyl manganese tricarbonyl†	12108-13-3 OP1450000	0.2 mg/m^3 TWA (skin)	CNS effects, systemic damage
4,4'-Methylene bis (2-chloro-aniline)** (MOCA)	101-14-4 CY1050000	Ca; 0.003 mg/m^3 TWA (skin)	Potential for cancer; liver and lung tumors in animals
Methylene bis(4-cyclohexyl-isocyanate) (see Dicyclohexylmethane 4,4-diisocyanate)			
Methylene bisphenyl isocyanate (MDI) (diphenylmethane diisocyanate) *Class: Diisocyanates*§	101-68-8 NQ9350000	0.005 ppm (0.050 mg/m^3) TWA, 0.020 ppm (0.200 mg/m^3) ceiling (10-min)	Respiratory effects, sensitization, pulmonary irritation
Methylene chloride‡ (dichloromethane)	75-09-2 PA8050000	Ca; lowest feasible concentration	Potential for cancer; tumors of the lung, liver, salivary, and mammary glands in animals

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects[a]
4,4'-Methylenedianiline (MDA)	101-77-9 BY5425000	Ca; lowest feasible concentration (0.03 mg/m^3 LOQ)	Bladder cancer, skin and liver effects
Metribuzin[†]	21087-64-9 XZ2990000	5 mg/m^3 TWA	CNS depression; thyroid and liver enzyme effects in animals
Mica (see Silicates)			
Mineral wool *Class: Synthetic vitreous fibers*[§]	[††]	3 million fibers/m^3 (fibers $\leq$ 3.5 μm in diameter and $\geq$ 10 μm long), 5 mg/m^3 TWA (total mineral wool dust)	Eye, skin, and respiratory effects
Molybdenum, soluble (see Appendix III)	7439-98-7 QA4680000		
Molybdenum, insoluble (see Appendix III)	7439-98-7 QA4680000		
Monochloroethane (ethyl chloride) *Class: Chloroethane*[§]	75-00-3 KH7525000	Handle with caution in the workplace	CNS effects, possible liver and kidney effects
Monocrotophos[†‡] (Azodrin®)	6923-22-4 TC4375000	0.25 mg/m^3 TWA	Reversible cholinesterase inhibition; behavioral symptoms and pulmonary effects in animals; mutagenic and possible teratogenic effects in animals

Monohalomethanes[§]	[††]	See individual chemical	
Monomethyl aniline[†]	100-61-8 BY4550000	0.5 ppm (2.0 mg/m^3) TWA (skin)	Anoxia resulting from the formation of methemoglobin
Morpholine[†]	110-91-8 QD6475000	20 ppm (70 mg/m^3) TWA (skin), 30 ppm (105 mg/m^3) STEL (skin)	Irritation to the skin, eyes, mucous membranes, and respiratory tract
Naphtha[†] (coal tar)	8030-30-6 DE3030000	100 ppm (400 mg/m^3) TWA	Narcosis; liver and kidney damage in animals
Naphthalene[†,‡]	91-20-3 QJ0525000	10 ppm (50 mg/m^3) TWA, 15 ppm (75 mg/m^3) STEL	Hemolysis and eye irritation that causes cataracts
Naphthalene diisocyanate (NDI) *Class: Diisocyanates*[§]	25551-28-4 NQ9600000	0.04 mg/m^3 TWA, 0.17 mg/m^3 ceiling (10-min)	Respiratory effects and sensitization, pulmonary irritation
α-Naphthylamine	134-32-7 QM1400000	Ca; use 29 CFR 1910.1004	Bladder cancer
ß-Naphthylamine[§]	91-59-8 QM2100000	Ca; use 29 CFR 1910.1009	Bladder cancer
NIAX® catalyst ESN[§]	62765-93-9 QR3900000	Lowest feasible concentration	Urological disorders, nervous system effects

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Nickel carbonyl	13463-39-3 QR6300000	Ca; 0.001 ppm (0.007 mg/m^3) TWA	Lung and nasal cancer
Nickel, metal, soluble, insoluble, and inorganic *Class: Nickel, inorganic*[§]	7440-02-0 QR5950000	Ca; 0.015 mg/m^3 TWA	Lung and nasal cancer, skin effects
Nickel sulfide roasting (as Ni) *Class: Nickel, inorganic*[§]	††	Ca; 0.015 mg/m^3 TWA	Lung and nasal cancer, skin effects
Nicotine[†,‡]	54-11-5 QS5250000	0.5 mg/m^3 TWA (skin)	Transient stimulation, depression, or paralysis of the CNS, peripheral autonomic ganglia, and nerve endings in skeletal muscle; teratogenic effects in animals
Nitric acid[**]	7697-37-2 QU5775000	2 ppm (5 mg/m^3) TWA, 4 ppm (10 mg/m^3) STEL	Dental erosion, nasal and lung irritation
Nitric oxide *Class: Oxides of nitrogen*[§]	10102-43-9 QX0525000	25 ppm (30 mg/m^3) TWA	Effects on blood and respiratory system
Nitriles[§]	††	See individual chemical	
p-Nitroaniline[†]	100-01-6 BY7000000	3 mg/m^3 TWA (skin)	Anoxia resulting from the formation of methemoglobin; jaundice and anemia
Nitrobenzene[†]	98-95-3 DA6475000	1 ppm (5 mg/m^3) TWA (skin)	Anoxia resulting from the formation of methemoglobin; anemia

4-Nitrobiphenyl	92-93-3 DV5600000	Ca; use 29 CFR 1910.1003	Potential for cancer; bladder tumors in animals
p-Nitrochlorobenzene†	100-00-5 CZ1050000	Ca; lowest feasible concentration (skin) (0.25 mg/m^3 LOQ)	Potential for cancer; vascular and liver tumors in animals; anoxia
Nitroethane†	79-24-3 KI5600000	100 ppm (310 mg/m^3) TWA	Mild skin irritation; narcosis, pulmonary irritation, and liver damage in animals
Nitrogen dioxide** *Class: Oxides of nitrogen*§	10102-44-0 QW9800000	1 ppm (1.8 mg/m^3) STEL	Respiratory and blood effects
Nitrogen trifluoride†	7783-54-2 QX19250000	10 ppm (29 mg/m^3) TWA	Anoxia resulting from the formation of methemoglobin in animals
Nitroglycerin**	55-63-0 QX2100000	0.1 mg/m^3 STEL (skin)	Circulatory effects
Nitromethane (see Appendix III)	75-52-5 PA9800000		
2-Nitronaphthalene *Class: β-Naphthylamine*§	581-89-5 QJ9760000	Ca; lowest feasible concentration	Bladder cancer
1-Nitropropane†	108-03-2 TZ5075000	25 ppm (90 mg/m^3) TWA	Eye irritation and mild respiratory irritation; liver and kidney damage in animals
2-Nitropropane‡	79-46-9 TZ5250000	Ca; lowest feasible concentration (1.4 ppm LOQ)	Potential for cancer; liver tumors in rats

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
N-Nitrosodimethylamine	62-75-9 IQ0525000	Ca; use 29 CFR 1910.1016	Potential for cancer; tumors of the liver, kidney, lung, and nasal cavity in animals
m-Nitrotoluene†	99-08-1 XT2975000	2 ppm (11 mg/m^3) TWA (skin)	Hypoxia/anoxia resulting from formation of methemoglobin
o-Nitrotoluene†	88-72-2 XT3150000	2 ppm (11 mg/m^3) TWA (skin)	Anoxia resulting from formation of methemoglobin
p-Nitrotoluene†	99-99-0 XT3325000	2 ppm (11 mg/m^3) TWA (skin)	Anoxia resulting from formation of methemoglobin
Nitrotrichloromethane (see Chloropicrin)			
Nitrous oxide *Class: Waste anesthetic gases and vapors*§	10024-97-2 QX1350000	25 ppm (30 mg/m^3) TWA for the duration of the exposure	Reproductive system effects and decreases in audiovisual performance
Nonane†	111-84-2 RA6115000	200 ppm (1050 mg/m^3) TWA	Narcosis
1-Nonanethiol (n-nonylmercaptan) *Class: Thiols*§	1455-21-6 ††	0.5 ppm (3.3 mg/m^3) ceiling (15-min)	Irritation; eye, skin, blood, and nervous system effects
Octachloronaphthalene†	2234-13-1 QK0250000	0.1 mg/m^3 TWA, 0.3 mg/m^3 STEL (skin)	Liver and skin effects

1-Octadecanethiol (octadecylmercaptan) *Class: Thiols*[§]	2885-00-9 ††	0.5 ppm (5.9 mg/m^3) ceiling (15-min)	Irritation; eye, skin, blood, and nervous system effects
Octane *Class: Alkanes*[§]	111-65-9 RG8400000	75 ppm (350 mg/m^3) TWA, 385 ppm (1,800 mg/m^3) ceiling (15-min)	Skin and nervous system effects
1-Octanethiol (n-octylmercaptan) *Class: Thiols*[§]	111-88-6 ††	0.5 ppm (3.0 mg/m^3) ceiling (15-min)	Irritation; eye, skin, blood, and nervous system effects
n-Octylmercaptan (see 1-Octanethiol)			
Oil mist,[†] mineral	8012-95-1 PY8030000	5 mg/m^3 TWA, 10 mg/m^3 STEL	Respiratory effects
Organic solvents[§]	††	See individual chemical	
Organotin compounds[§]	††	See individual chemical	
Osmium tetroxide[†] (as Os)	20816-12-0 RN11400000	0.0002 ppm (0.002 mg/m^3) TWA, 0.0006 ppm (0.006 mg/m^3) STEL	Severe irritation of the eyes and respiratory tract
Oxalic acid[†,‡]	144-62-7 RO2450000	1 mg/m^3 TWA, 2 mg/m^3 STEL	Eye, mucous membrane, and skin irritation

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Oxides of nitrogen[§]	††	See individual chemical	
Oxygen difluoride[†]	7783-41-7 RS2100000	0.05 ppm (0.1 mg/m^3) ceiling	Severe respiratory irritation
Ozone[†]	10028-15-6 RS8225000	0.1 ppm (0.2 mg/m^3) ceiling	Upper and lower respiratory tract irritation
Paraffin wax fume[†]	8002-74-2 RV0350000	2 mg/m^3 TWA	Discomfort and nausea
Paraquat[†] Respirable dust	4685-14-7 DW1960000	0.1 mg/m^3 TWA (skin)	Eye, mucous membrane, and skin irritation
Parathion[‡,**]	56-38-2 TF4550000	0.05 mg/m^3 TWA (skin)	Nervous system effects
Particulates not otherwise regulated (see Appendix III)	††		
Pentaborane[†]	19624-22-7 RY8925000	0.005 ppm (0.01 mg/m^3) TWA, 0.015 ppm (0.03 mg/m^3) STEL	Toxicity, nervous system effects, narcosis and hyperexcitation
Pentachloroethane *Class: Chloroethanes*[§]	76-01-7 KI6300000	Handle with caution in the workplace	CNS effects, possible liver and kidney effects

Pentachloronaphthalene†	1321-64-8 QK0300000	0.5 mg/m^3 TWA (skin)	Liver and skin toxicity
Pentachlorophenol†,‡	87-86-5 SM6300000	0.5 mg/m^3 TWA (skin)	Eye and upper respiratory irritation, increased metabolic rate and hyperpyrexia
Pentaerythritol†	115-77-5 RZ2490000		Physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Pentane‡ *Class: Alkane*§	109-66-0 RZ9450000	120 ppm (350 mg/m^3) TWA, 610 ppm (1,800 mg/m^3) ceiling (15-min)	Skin and nervous system effects
1-Pentanethiol‡ (pentylmercaptan) *Class: Thiols*§	110-66-7 SA3150000	0.5 ppm (2.1 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects
2-Pentanone (see Methyl propyl ketone)			
Pentylmercaptan (see 1-Pentanethiol)			
Perchloroethylene (see Tetrachloroethylene)			

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Perchloromethyl mercaptan†	594-42-3 PB0370000	0.1 ppm (0.8 mg/m^3) TWA	Severe pulmonary irritation and lacrimation, liver and kidney damage
Perchloryl fluoride†	7616-94-6 SD1925000	3 ppm (14 mg/m^3) TWA, 6 ppm (28 mg/m^3) STEL	Mucous membrane irritation; methemoglobinemia and pulmonary edema in animals
Perlite†	93763-70-3 SD5254000		Eye, skin, and other forms of physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Pesticides§	††	See individual chemicals	
Petroleum distillates (naphtha) *Class: Refined petroleum products*§	8002-05-9 SE7449000	350 mg/m^3 TWA, 1,800 mg/m^3 ceiling (15-min)	Eye, nose, and throat irritation; dermatitis; nervous system effects
Phenol‡,**	108-95-2 SJ3325000	5 ppm (19 mg/m^3) TWA (skin), 15.6 ppm (60 mg/m^3) ceiling (15-min) (skin)	Skin, eye, CNS, liver, and kidney effects
Phenothiazine†	92-84-2 SN5075000	5 mg/m^3 TWA (skin)	Skin sensitization
N-Phenyl-ß-naphthylamine *Class: ß-Naphthylamine*§	135-88-6 QM4550000	Ca; lowest feasible concentration	Bladder cancer

Phenyl ether,† vapor	101-84-8 KN8970000	1 ppm (7 mg/m^3) TWA	Mild toxicity; eye and nose irritation in animals
Phenyl ether-biphenyl mixture†, vapor	††	1 ppm (7 mg/m^3) TWA	Eye, skin, and upper respiratory irritation
Phenyl glycidyl ether *Class: Glycidyl ethers*§	122-60-1 TZ3675000	Ca; 1 ppm (6 mg/m^3) ceiling (15-min)	Skin and mucous membrane effects, potential for sensitization, possible hematopoietic and reproductive effects; epidermoid nasal carcinomas and squamous metaplasia of the nasal epithelium in rats
Phenyl mercaptan (see Benzenethiol)			
p-Phenylene diamine†	106-50-3 SS8050000	0.1 mg/m^3 TWA (skin)	Skin and respiratory sensitization, bronchial asthma
Phenylethylene (see Styrene)			
Phenylhydrazine** *Class: Hydrazines*§	100-63-0 MV8925000	Ca; 0.14 ppm (0.6 mg/m^3) ceiling (120-min) (skin)	Potential for cancer; blood, liver, and skin effects; tumors of the lung, liver, blood vessels, and intestines in animals
Phenylphosphine†	638-21-1 SZ2100000	0.05 ppm (0.25 mg/m^3) ceiling	CNS effects, irritation

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Phorate[†,‡]	298-02-2 TD9450000	0.05 mg/m^3 TWA, 0.2 mg/m^3 STEL (skin)	Organo-phosphorus cholinesterase inhibition
Phosdrin[†] (Mevinphos[●‡])	7786-34-7 GQ5250000	0.01 ppm (0.1 mg/m^3) TWA, 0.03 ppm (0.3 mg/m^3) STEL (skin)	Cholinesterase inhibition
Phosgene (carbonyl chloride)	75-44-5 SY5600000	0.1 ppm (0.4 mg/m^3) TWA, 0.2 ppm (0.8 mg/m^3) ceiling (15-min)	Respiratory irritation and effects
Phosphine[†]	7803-51-2 SY7525000	0.3 ppm (0.4 mg/m^3) TWA, 1.0 ppm (1.0 mg/m^3) STEL	Severe pulmonary irritation and acute systemic poisoning
Phosphoric acid[†,‡]	7664-38-2 TB6300000	1 mg/m^3 TWA, 3 mg/m^3 STEL	Mild irritation of the eyes, upper respiratory tract, and skin
Phosphorus[†,‡] (yellow)	7723-14-0 TH3500000	0.1 mg/m^3 TWA	Respiratory and eye irritation, skin burns
Phosphorus oxychloride[†]	10025-87-3 TH4897000	0.1 ppm (0.6 mg/m^3) TWA, 0.5 ppm (3.0 mg/m^3) STEL	Eye and respiratory irritation, gastric effects, narcotic effects, pulmonary edema, nephritis
Phosphorus pentachloride[†]	10026-13-8 TB6125000	1 mg/m^3 TWA	Severe irritation of the eyes, mucous membranes, and respiratory tract; bronchitis
Phosphorus pentasulfide[†]	1314-80-3 TH3675000	1 mg/m^3 TWA, 3 mg/m^3 STEL	Eye and skin irritation

Phosphorus trichloride†	7719-12-2 TH3675000	0.2 ppm (1.5 mg/m^3) TWA, 0.5 ppm (3.0 mg/m^3) STEL	Severe irritation of the eyes, mucous membranes, and skin; respiratory effects ranging from bronchial spasm to severe pulmonary edema
Phthalic anhydride†	85-44-9 TI3150000	1 ppm (6 mg/m^3) TWA	Skin and respiratory irritation and sensitization, eye irritation causing conjunctivitis
m-Phthalodinitrile†	626-17-5 CZ1900000	5 mg/m^3 TWA	Skin irritation
Picloram‡ (see Appendix III)	1918-02-1 TJ7525000		
Picric acid† (2,4,6-trinitrophenyl)	88-89-1 TJ7875000	0.1 mg/m^3 TWA (skin), 0.3 mg/m^3 STEL (skin)	Sensitization dermatitis
Pindone†,‡ (2-pivalyl-1,3-indandione)	83-26-1 NK6300000	0.1 mg/m^3 TWA	Vitamin K antagonist and inhibition of prothrombin
Piperazine dihydrochloride†,‡	142-64-3 TL4025000	5.0 mg/m^3 TWA	Eye and skin irritation and sensitization
Plaster of Paris†	26499-65-0 TP0700000		Skin, eye, and other forms of physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Platinum† (as Pt)	7440-06-4 TP2160000		Asthma, skin sensitization, eye irritation
Metal		1 mg/m^3 TWA	
Soluble salts		0.002 mg/m^3 TWA	
Polychlorinated biphenyls§ (PCBs)	††	See individual chemical	Potential for cancer; skin, liver, and reproductive effects; tumors of the liver and pituitary gland and leukemias in animals
Portland cement†	65997-15-1 VV8770000		Eye irritation, dermatitis
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Potassium hydroxide†,‡	1310-58-3 TT2100000	2 mg/m^3 ceiling	Severe irritation of the eyes, mucous membranes, and skin
Propane†	74-98-6 TX2275000	1,000 ppm (1,800 mg/m^3) TWA	Asphyxiation
Propane sultone†	1120-71-4 RP5425000	Ca; lowest feasible concentration	Skin tumors, leukemia, and gliomas in rats and mice
1-Propanethiol (n-propyl mercaptan) *Class: Thiols*§	107-03-9 TZ7300000	0.5 ppm (1.6 mg/m^3) ceiling (15-min)	Eye and skin irritation, blood and nervous system effects

Propargyl alcohol[†]	107-19-7 UK5075000	1 ppm (2 mg/m^3) TWA (skin)	Skin and mucous membrane irritation, CNS depression, liver and kidney damage
ß-Propiolactone	57-57-8 RQ7350000	Ca; use CFR 29 1910.1013	Potential for cancer; tumors of the liver, skin, and stomach in animals
Propionic acid[†,‡]	79-09-4 UE5950000	10 ppm (30 mg/m^3) TWA, 15 ppm (45 mg/m^3) STEL	Mild irritation of the skin, eyes, and mucosal surfaces
Propionitrile *Class: Nitriles*[§]	107-12-0 UF9625000	6 ppm (14 mg/m^3) TWA	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Propoxur[†] (Baygon)	114-26-1 FC3150000	0.5 mg/m^3 TWA	Cholinesterase inhibition
n-Propyl acetate[†]	109-60-4 AJ3675000	200 ppm (840 mg/m^3) TWA, 250 ppm (1,050 mg/m^3) STEL	Conjunctival and upper respiratory irritation; narcosis in animals
n-Propyl alcohol[†]	71-23-8 UH8225000	200 ppm (500 mg/m^3) TWA (skin), 250 ppm (625 mg/m^3) STEL (skin)	Mild narcosis, upper respiratory irritation
n-Propyl nitrate[†]	627-13-4 UK0350000	25 ppm (105 mg/m^3) TWA, 40 ppm (170 mg/m^3) STEL	Anoxia resulting from the formation of methemoglobin
Propylene dichloride[†,‡] (1,2-dichloropropane)	78-87-5 TX9625000	Ca; lowest feasible concentration (0.03 ppm LOQ)	Potential for cancer; narcosis; eye irritation; mammary gland tumors and liver tumors in animals

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Propylene glycol dinitrate†	6423-43-4 TY6300000	0.05 ppm (0.3 mg/m^3) TWA (skin)	Hepatotoxic, hematologic, and CNS effects
Propylene glycol monomethyl ether†	107-98-2 UB7700000	100 ppm (360 mg/m^3) TWA, 150 ppm (540 mg/m^3) STEL	Eye, nose, and throat irritation; CNS depression
Propylene imine†	75-55-8 CM8050000	Ca; 2 ppm (5 mg/m^3) TWA (skin)	Potential for cancer; brain and mammary tumors in animals
Propylene oxide‡	75-56-9 TZ2975000	Ca; lowest feasible concentration (8.4 ppm LOQ)	Potential for cancer; nasal tumors in animals
n-Propylmercaptan (see 1-Propanethiol)			
Propyne (see Methyl acetylene)			
Pyrethrum†	8003-34-7 UR4200000	5 mg/m^3 TWA	Dermatitis and sensitization; intoxication in animals
Pyridine†,‡	110-86-1 UR8400000	5 ppm (15 mg/m^3) TWA	Mild irritation to eyes and mucous membranes, narcosis; kidney and liver damage in animals

Quinone[†‡]	106-51-4 DK2625000	0.1 ppm (0.4 mg/m^3) TWA	Eye irritation, conjunctivitis, corneal edema, ulceration, scarring
Refined petroleum solvents[§]	[††]	See individual chemical	
Resorcinal[†]	108-46-3 VG9625000	10 ppm (45 mg/m^3) TWA, 20 ppm (90 mg/m^3) STEL	Irritation, methemoglobinemia
Rhodium[†] (as Rh), metal fume and insoluble compounds	7440-16-6 VI9069000	0.1 mg/m^3 TWA	Possible respiratory sensitization
Rhodium[†] (as Rh), soluble compounds	7440-16-6 VI9069000	0.001 mg/m^3 TWA	Mild eye irritation in animals
Ronnel[†‡]	299-84-3 TG0525000	10 mg/m^3 TWA	Weak cholinesterase inhibition
Rosin core solder, pyrolysis products[†] (as formaldehyde)	[††]	0.1 mg/m^3 TWA; Ca in the presence of formaldehyde, acetaldehyde, or malonaldehyde	Respiratory irritation
Rotenone[†‡]	83-79-4 DJ2800000	5 mg/m^3 TWA	Nervous system effects and convulsions in animals
Rouge (see Appendix III)	[††]		

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Selenium compounds† (as Se)	7782-49-2 VS7700000	0.2 mg/m^3 TWA	Eye, upper respiratory, and skin irritation; damage to the liver, kidney, spleen, and heart in animals
Selenium hexafluoride† (as Se)	7783-79-1 VS9450000	0.05 ppm (0.4 mg/m^3) TWA	Severe respiratory irritation in animals
Silica, amorphous†, diatomaceous earth containing less than 1% crystalline silica	61790-53-2 HL8600000	6 mg/m^3 TWA	Pulmonary fibrosis
Silica, amorphous,†,‡ precipitated, and gel	7699-41-4 VV8850000	6 mg/m^3 TWA	Pulmonary fibrosis
Silica, crystalline cristobalite	14464-46-1 VV7325000	Ca; 0.05 mg/m^3 TWA	Chronic lung disease (silicosis)
Silica, crystalline quartz	14808-60-7 VV7330000	Ca; 0.05 mg/m^3 TWA	Chronic lung disease (silicosis)
Silica, crystalline tridymite	15468-32-3 VV7335000	Ca; 0.05 mg/m^3 TWA	Chronic lung disease (silicosis)
Silica, crystalline tripoli	1317-95-9 VV7336000	Ca; 0.05 mg/m^3 TWA	Chronic lung disease (silicosis)

Silica, fused	60676-86-0 VV7328000	Ca; 0.05 mg/m^3 TWA	Chronic lung disease (silicosis)
Silicates[†] (<1% crystalline silica):			Fibrotic pneumoconiosis
Mica, respirable dust	12001-26-2 VV8760000	3 mg/m^3 TWA	
Soapstone, total dust	††	6 mg/m^3 TWA	
Soapstone, respirable dust	VV8780000	3 mg/m^3 TWA	
Talc (containing asbestos)	14807-96-6 WW2710000	Ca; 100,000 fibers/m^3 (fibers >5 μm long; in a 400-liter sample)	
Talc (containing no asbestos) (see Talc)			
Silicon[†]	7440-21-3 VW0400000		Eye, skin, and mucous membrane irritation; respiratory effects
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Silicon carbide[†]	409-21-2 VW0450000		Physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Silicon tetrahydride[†]	7803-62-5 VV1400000	5 ppm (7 mg/m^3) TWA	Moderate irritation of the eyes, skin, and mucous membranes
Silver[†,‡] metal and soluble compounds	7440-22-4 VW3675000	0.01 mg/m^3 TWA	Argyria; local or generalized impregnation of the mucous membranes, skin, and eyes with silver

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Soapstone (see Silicates)			
Sodium azide†	26628-22-8 VV8050000	0.1 ppm ceiling (skin) as HN_3, 0.3 mg/m^3 ceiling (skin) as NaN_3	Hypotension, cardiovascular effects, irritation
Sodium bisulfite†,‡	7631-90-5 VZ2000000	5 mg/m^3 TWA	Eye, skin, and mucous membrane irritation
Sodium fluoroacetate†,‡	62-74-8 AH9100000	0.05 mg/m^3 TWA (skin), 0.15 mg/m^3 STEL (skin)	Convulsions and ventricular fibrillation, kidney damage
Sodium hydroxide‡	1310-73-2 WB490000	2 mg/m^3 ceiling (15-min)	Respiratory irritation
Sodium metabisulfite†	7681-57-4 UX8225000	5 mg/m^3 TWA	Skin, eye, lung, nose, and throat irritation
Starch†	9005-25-8 GM5090000		Eye, skin, and other physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Stibine†	7803-52-3 WJ0700000	0.1 ppm (0.5 mg/m^3) TWA	Toxic hemolysis, liver, and kidney damage; lung irritation

Stoddard solvent[‡] *Class: Refined petroleum solvents*[§]	8052-41-3 WJ8925000	350 mg/m^3 TWA, 1,800 mg/m^3 ceiling (15-min)	Eye, nose, and throat irritation; dermatitis, nervous system effects
Strychnine[†,‡]	57-24-9 WL2275000	0.15 mg/m^3 TWA	Convulsions
Styrene[**] (vinyl benzene; phenylethylene)	100-42-5 WL3675000	50 ppm (215 mg/m^3) TWA, 100 ppm (425 mg/m^3) STEL	Nervous system effects, eye and respiratory irritation, reproductive effects
Subtilisins[†] (proteolytic enzymes)	9014-01-1 CO9450000, CO9550000	0.00006 mg/m^3 STEL (60-min)	Respiratory sensitization, skin irritation, respiratory effects
Succinonitrile *Class: Nitriles*[§]	110-61-2 WN3850000	6 ppm (20 mg/m^3) TWA	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Sucrose[†]	57-50-1 WN6500000		Physical irritation
Total dust		10 mg/m^3 TWA	
Respirable dust		5 mg/m^3 TWA	
Sulfotep (see TEDP)			
Sulfur dioxide[‡,**]	7446-09-5 WS4550000	2 ppm (5 mg/m^3) TWA, 5 ppm (10 mg/m^3) STEL	Respiratory effects
Sulfur hexafluoride[†]	2551-62-4 WS4900000	1,000 ppm (6,000 mg/m^3) TWA	Mild effect on the nervous system

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Also listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Sulfuric acid‡	7664-93-9 WS5600000	1 mg/m^3 TWA	Pulmonary irritation
Sulfuric acid, fuming	8014-95-7 WS5605000	1 mg/m^3 TWA	Pulmonary irritation
Sulfur monochloride†	10025-67-9 WS4300000	1 ppm (6 mg/m^3) ceiling	Severe irritation of the eyes, mucous membranes, and skin; respiratory irritation
Sulfur pentafluoride†	5714-22-7 WS4480000	0.01 ppm (0.1 mg/m^3) ceiling	Severe pulmonary irritation in animals
Sulfur tetrafluoride†	7783-60-0 WT4800000	0.1 mg/m^3 (0.4 mg/m^3) ceiling	Severe pulmonary irritation in animals
Sulfuryl fluoride†,‡	2699-79-8 WT5075000	5 ppm (20 mg/m^3) TWA, 10 ppm (40 mg/m^3) STEL	Respiratory irritation, CNS depression
Sulprofos†	35400-43-2 TE4165000	1 mg/m^3 TWA	Mild organophosphate cholinesterase inhibition
Systox® (see Demeton)			
2,4,5-T†,‡	93-76-5 AJ8400000	10 mg/m^3 TWA	Mild toxic effects; stiffness to ataxia in animals
Talc (containing asbestos) (see Asbestos)			

Talc† (containing no asbestos)	14807-96-6 WW2700000	2 mg/m^3 TWA	Nonmalignant respiratory effects, talc pneumoconiosis
Tantalum,† metal and oxide dust	7440-25-7 WW5505000	5 mg/m^3 TWA, 10 mg/m^3 STEL	Respiratory effects
TEDP†,‡ (sulfotep)	3689-24-5 XN4375000	0.2 mg/m^3 TWA (skin)	Cholinesterase inhibition
Tellurium† and compounds	13494-80-9 WY2625000	0.1 mg/m^3 TWA	Malaise; CNS and red blood cell effects in animals
Tellurium hexafluoride†	7783-80-4 WY2800000	0.02 ppm (0.2 mg/m^3) TWA	Severe respiratory irritation
Temephos†,‡	3383-96-8 TF6890000		Cholinesterase inhibition; reduced carboxylesterase activity
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
TEPP†,‡ (tetraethyl pyrophosphate)	107-49-3 UX6825000	0.05 mg/m^3 TWA (skin)	Cholinesterase inhibition
Terphenyls†	26140-60-3 WZ6450000	0.5 ppm (5 mg/m^3) ceiling	Skin and respiratory irritation; conjunctival irritation in animals
1,1,1,2-Tetrachloro-2,2-difluoroethane†	76-11-9 KI1425000	500 ppm (4,170 mg/m^3) TWA	Narcosis, skin, and eye irritation; difficulty in breathing
1,1,2,2-Tetrachloro-1,2-difluoroethane†	76-12-0 KI1420000	500 ppm (4,170 mg/m^3) TWA	Narcosis, skin, and eye irritation; difficulty in breathing

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (dioxin)	1746-01-6 HP3500000	Ca; lowest feasible concentration	Potential for cancer; chloracne; tumors at many sites in animals
1,1,1,2-Tetrachloroethane *Class: Chloroethanes*[§]	630-20-6 KI8450000	Handle with caution in the workplace	CNS effects, possible liver and kidney effects
1,1,2,2-Tetrachloroethane[‡,**]	79-34-5 KI8575000	Ca; 1 ppm (7 mg/m^3) TWA (0.7 ppm LOQ) (skin)	Potential for cancer, liver, gastrointestinal, and nervous system effects; tumors of the liver in animals
Tetrachloroethylene[‡] (perchloroethylene)	127-18-4 KX3850000	Ca; lowest feasible concentration (0.4 ppm LOQ)	Potential for cancer; tumors of the liver in animals
Tetrachloromethane (see Carbon tetrachloride)			
Tetrachloronaphthalene[†]	1335-88-2 QK3700000	2 mg/m^3 TWA (skin)	Liver and skin toxicity
Tetraethyl lead[†] (as Pb)	78-00-2 TP4550000	0.075 mg/m^3 TWA (skin)	Nervous system effects, mental aberrations, psychosis, mania, convulsions
Tetrahydrofuran[†]	109-99-9 LU5950000	200 ppm (590 mg/m^3) TWA, 250 ppm (735 mg/m^3) STEL	Anesthetic effects, mild upper respiratory tract irritation
Tetramethyl lead[†]	75-74-1 TP4725000	0.075 mg/m^3 TWA (skin)	Irritability; CNS effects in animals

Tetramethyl succinonitrile** *Class: Nitriles*§	3333-52-6 WN4025000	0.5 ppm (3 mg/m^3) TWA (skin)	Hepatic, renal, respiratory, cardiovascular, gastrointestinal, and nervous system effects
Tetranitromethane†	509-14-8 PB4025000	1 ppm (8 mg/m^3) TWA	Severe irritation of the eyes and respiratory tract
Tetrasodium pyrophosphate†,‡	7722-88-5 UX7350000	5 mg/m^3 TWA	Eye and respiratory irritation
Tetryl† (2,4,6-trinitro-phenylmethylnitramine)	479-45-8 BY6300000	1.5 mg/m^3 TWA (skin)	Severe sensitization dermatitis, upper respiratory tract irritation
Thallium,† soluble compounds	7440-28-0 XG3425000	0.1 mg/m^3 TWA (skin)	Extreme toxic effects, effects on nervous system and body hair, kidney damage
4,4′-Thiobis-(6-tertbutyl-m-cresol)†	96-69-5 GP3150000		Eye, skin, and other physical irritation
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Thioglycolic acid†	68-11-1 AI5950000	1 ppm (4 mg/m^3) TWA (skin)	Eye and skin irritation, systemic effects
Thiols§	††	See individual chemical	
Thionyl chloride†	7719-09-7 XM5150000	1 ppm (5 mg/m^3) ceiling	Eye, skin, and mucous membrane irritation

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Thiram[†,‡]	137-26-8 JO1400000	5 mg/m^3 TWA	Respiratory, eye, and skin irritation; sensitization dermatitis; teratogenic effects in animals
Tin[†], inorganic compounds (as Sn)	7440-31-5 XP7320000	2 mg/m^3 TWA	Eye and skin irritation
Tin[**], organic compounds *Class: Organotin compounds*[§]	††	0.1 mg/m^3 TWA (skin)	Eye, skin, liver, nervous system, and heart effects
Tin oxide[†] (as Sn)	1332-29-2 XQ3980000	2 mg/m^3 TWA	Reduced pulmonary capacity, stannosis
Titanium dioxide[†]	13463-67-7 XR2275000	Ca; lowest feasible concentration (0.2 mg/m^3 LOQ)	Potential for cancer; lung tumors in animals
o-Tolidine-based dyes	††	Ca; lowest feasible concentration	Bladder cancer
o-Tolidine	119-93-7 DD1225000	Ca; 0.02 mg/m^3 ceiling (60-min)	Potential for cancer; tumors of the liver, urinary bladder, and mammary glands in animals
Toluene[**]	108-88-3 XS5250000	100 ppm (375 mg/m^3) TWA, 150 ppm (560 mg/m^3) STEL	CNS depression

Toluene diisocyanate (TDI)	26471-62-5 NQ9490000	Ca; lowest feasible concentration	Potential for cancer; tumors of the pancreas, liver, skin, mammary glands, and circulatory system in animals
Toluenediamine (TDA)	95-80-7 XS9625000	Ca; lowest feasible concentration	Potential for cancer; tumors of the liver, skin, and mammary glands in animals
m-Toluidine (see Appendix III)	108-44-1 XU2800000		
o-Toluidine	95-53-4 XU2975000	Ca; lowest feasible concentration (skin)	Potential for cancer; tumors of the liver, bladder, and mammary glands in animals
p-Toluidine[†]	106-49-0 XU3150000	Ca; lowest feasible concentration (0.15 ppm LOQ) (skin)	Potential for cancer; tumors of the liver in animals
Toxaphene[‡] (see Chlorinated camphene)			
Tremolite *Class: Asbestos*[§]	77536-68-6 CI6560000	Ca; 0.1 fibers/cc (see 29 CFR 1910.1101)	Lung cancer, mesothelioma, asbestosis
Tributyl phosphate[†]	126-73-8 TC7700000	0.2 ppm (2.5 mg/m^3) TWA	Pulmonary irritation; moderate excitation of nervous system in animals
Trichloroacetic acid[†,‡]	76-03-9 AJ7875000	1 ppm (7 mg/m^3) TWA	Skin and eye irritation

[*]Consult primary sources in Section A for definitive information.
[†]REL adopted during OSHA hearings (Appendix II).
[‡]Listed as a pesticide in Appendix V.
[§]Appendix I lists all members of the class indicated; refer to class name in Section A.
[**]REL revised during OSHA hearings (Appendix IV).
[††]CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
1,2,4-Trichlorobenzene[†,‡]	120-82-1 DC2100000	5 ppm (40 mg/m^3) ceiling	Eye, throat, and dermal irritation
1,1,1-Trichloroethane[‡] (methyl chloroform) *Class: Chloroethanes*[§]	71-55-6 KJ2975000	350 ppm (1,910 mg/m^3) ceiling (15-min)	CNS, liver, and cardiovascular effects
1,1,2-Trichloroethane[‡,**] *Class: Chloroethanes*[§]	79-00-5 KJ3150000	Ca; 10 ppm (45 mg/m^3) TWA (skin)	Potential for cancer, CNS effects; liver tumors in animals
Trichloroethylene[‡,§]	79-01-6 KX4550000	Ca; 25 ppm TWA; 2 ppm ceiling (1-hr) as a Waste anestetic gas	Potential for cancer, CNS effects; liver tumors in animals
Trichloromethane (see Chloroform)			
Trichloronaphthalene[†]	1321-65-9 QK4025000	5 mg/m^3 TWA (skin)	Toxic effects on the liver and skin
1,2,3-Trichloropropane[†]	96-18-4 TZ9275000	Ca; 10 ppm (60 mg/m^3) TWA (skin)	Eye and mucous membrane irritation; potential for cancer, liver and kidney effects, narcosis in animals
1,1,2-Trichloro-1,2,2-trifluoroethane[†]	76-13-1 KJ4000000	1,000 ppm (7,600 mg/m^3) TWA, 1,250 ppm (9,500 mg/m^3) STEL	CNS depression, cardiac sensitization, mild mucous membrane irritation
Triethylamine (see Appendix III)	121-44-8 YE0175000		

Trifluorobromomethane†	75-63-8 PA5425000	1,000 ppm (6,100 mg/m^3) TWA	Narcotic effects; CNS effects in animals
Trimellitic anhydride**	552-30-7 DC2050000	0.005 ppm (0.04 mg/m^3) TWA; handle in the workplace as an extremely toxic substance	Pulmonary edema; immunologic sensitization; pulmonary, eye, nose, and skin irritation
Trimethylamine†	75-50-3 PA0350000	10 ppm (24 mg/m^3) TWA, 15 ppm (36 mg/m^3) STEL	Eye, respiratory, and skin irritation
Trimethyl benzene†	25551-13-7 DC3220000	25 ppm (125 mg/m^3) TWA	Skin irritation, CNS depression, respiratory failure
Trimethyl phosphite†	121-45-9 TH1400000	2 ppm (10 mg/m^3) TWA	Eye, skin, and upper respiratory irritation; teratogenic and reproductive effects in animals
2,4,6-Trinitrophenyl (see Picric acid)			
2,4,6-Trinitrophenylmethyl nitramine (see Tetryl)			
2,4,6-Trinitrotoluene† (TNT)	118-96-7 XU0175000	0.5 mg/m^3 TWA (skin)	Kidney and liver damage, aplastic anemia, cyanosis, dermatitis
Triorthocresyl phosphate†	78-30-8 TD0350000	0.1 mg/m^3 TWA (skin)	Peripheral neuropathy, flaccid paralysis of the distal muscles of the upper and lower extremities, spastic paralysis

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Triphenyl amine†	603-34-9 YK2680000	5 mg/m³ TWA	Skin irritation
Triphenyl phosphate†	115-86-6 TC8400000	3 mg/m³ TWA	Neurotoxicity in animals
Tungsten§ and cemented tungsten carbide:			Lung and skin effects
Tungsten			
Containing >2% cobalt	12070-12-1	0.05 (Co) mg/m³ TWA	
Containing >0.3% nickel	Y07250000	0.015 (Ni) mg/m³ TWA	
Tungsten**	7440-33-7		
Insoluble compounds§	Y07175000	5 mg/m³ TWA, 10 mg/m³ STEL	Lung and skin effects
Soluble compounds		1 mg/m³ TWA, 3 mg/m³ STEL	
Turpentine†	8006-64-2 YO8400000	100 ppm (560 mg/m³) TWA	Mucous membrane irritation, convulsions, albuminuria, hematuria
1-Undecanethiol *Class: Thiols*§	5332-52-5 ††	0.5 ppm (3.9 mg/m³) ceiling (15-min)	Eye, skin, and blood irritation, nervous system effects

Uranium†			
Soluble compounds	7440-61-1		Potential for hepatocellular cancers as a result of its alpha-emitting properties and radioactive decay products (e.g., radon, etc.)
Insoluble compounds	YR3490000		
		Ca; 0.05 mg/m³ TWA	
		Ca; 0.2 mg/m³ TWA, 0.6 mg/m³ STEL	
n-Valeraldehyde† *Class: Aldehydes*§	110-62-3 YV3600000	50 ppm (175 mg/m³) TWA	Severe eye and skin irritation
Vanadium§ (as V), Respirable dust and fume	1314-62-1 YW2450000	0.05 mg/m³ ceiling (15-min)	Eye, skin, and lung effects
Vegetable oil mist†	68956-68-3 YX1850000		Physical irritation
Total dust		10 mg/m³ TWA	
Respirable fraction		5 mg/m³ TWA	
Vinyl acetate	108-05-4 AK0875000	4 ppm (15 mg/m³) ceiling (15-min)	Eye, nose, and throat irritation
Vinyl benzene (see Styrene)			
Vinyl bromide *Class: Vinyl halides*§	593-60-2 KU8400000	Ca; lowest feasible concentration (0.2 ppm LOQ)	Potential for cancer; liver and kidney tumors in animals
Vinyl chloride	75-01-4 KU9625000	Ca; lowest feasible concentration	Liver cancer
Vinylcyanide (see Acrylonitrile)			

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Vinyl cyclohexene dioxide†	106-87-6 RN8640000	Ca; 10 ppm (60 mg/m^3) TWA (skin)	Potential for cancer; skin tumors in animals
Vinyl fluoride *Class: Vinyl halides*§	75-02-5 YZ7351000	1 ppm TWA, 5 ppm ceiling (15-min); use 29 CFR 1910.1017	CNS effects; mutagenic effects in bacterial systems
Vinyl halides§	††	See individual chemical	
Vinyl toluene†	25013-15-4 WL5075000	100 ppm (480 mg/m^3) TWA	Eye, upper respiratory, and skin irritation
Vinylidene chloride (1,1-dichloroethylene) *Class: Vinyl halides*§	75-35-4 KV9275000	Ca; lowest feasible concentration (0.4 ppm LOQ)	Potential for cancer; liver and kidney tumors in animals
Vinylidene fluoride *Class: Vinyl halides*§	75-38-7 KW0560000	1 ppm TWA, 5 ppm ceiling (15-min); use 29 CFR 1910.1017	CNS effects; mutagenic effects in bacterial systems
VM&P naphtha *Class: Refined petroleum solvents*§	8032-32-4 OI6180000	350 mg/m^3 TWA, 1,800 mg/m^3 ceiling (15-min)	Eye, nose, and throat irritation; dermatitis; nervous system effects
Warfarin†,‡	81-81-2 GN4550000	0.1 mg/m^3 TWA	Hypoprothrombinemia and vascular injury resulting in internal hemorrhage
Waste anesthetic gases and vapors§	††	See individual chemical	

Welding, fumes and total particulates	††	Ca; lowest feasible concentration	Cancer, respiratory disease
Wood dust, all soft and hard woods	††	Ca; 1 mg/m³ TWA	Pulmonary dysfunction, respiratory effects
Xylene, isomers‡,**	1330-20-7 ZE2100000	100 ppm (435 mg/m³) TWA, 150 ppm (655 mg/m³) STEL	CNS depression, respiratory and eye irritation
m-Xylene	108-38-3 ZE2275000		
o-Xylene	95-47-6 ZE2450000		
p-Xylene	106-42-3 ZE2625000		
m-Xylene α,α′-diamine†	1477-55-0 PF8970000	0.1 mg/m³ ceiling (skin)	Skin irritation, systemic effects
Xylidine†	1300-73-8 ZE8575000	2 ppm (10 mg/m³) TWA (skin)	Anoxia resulting from formation of methemoglobin in humans; lung, liver and kidney damage in animals
Yttrium†	7440-65-5 ZG2980000	1 mg/m³ TWA	Pulmonary irritation in animals
Zinc chloride fume†	7646-85-7 ZH1400000	1 mg/m³ TWA, 2 mg/m³ STEL	Eye, mucous membrane, and skin irritation; pulmonary edema

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).
††CAS No. or RTECS No. not assigned.

Table 1 (Continued).—NIOSH recommended safety and health standards for hazardous agents in the workplace

Hazardous agent	CAS No. and RTECS No.	NIOSH REL	Health effects*
Zinc chromate *Class: Chromium*§	13530-65-9 GB3290000 GB3300000	Ca; 0.001 mg/m^3 TWA	Lung cancer, skin ulcers, lung irritation
Zinc oxide, fume**	1314-13-2 ZH4810000	5 mg/m^3 TWA, 10 mg/m^3 STEL	Metal fume fever
Zinc oxide,‡ total dust	1314-13-2 ZH4810000	5 mg/m^3 TWA, 15 mg/m^3 TWA ceiling (15-min)	Metal fume fever
Zinc stearate†	557-05-1 ZH5200000		Pulmonary effects
Total dust		10 mg/m^3 TWA	
Respirable fraction		5 mg/m^3 TWA	
Zirconium compounds† (except zirconium tetrachloride)	7440-67-7 ZH7070000	5 mg/m^3 TWA, 10 mg/m^3 STEL	Granulomas of the skin
Zirconium tetrachloride (see Appendix III)			

*Consult primary sources in Section A for definitive information.
†REL adopted during OSHA hearings (Appendix II).
‡Also listed as a pesticide in Appendix V.
§Appendix I lists all members of the class indicated; refer to class name in Section A.
**REL revised during OSHA hearings (Appendix IV).

Table 2.—NIOSH recommended safety and health standards for physical hazards in the workplace

Physical hazard	NIOSH recommendation	Health effects*
Electrical energy and electrocutions	Numerous work practice and control recommendations for reducing the risk of electrocutions and related injuries	Injury and death
Hand-arm vibration	Redesign tools and jobs; use protective clothing and equipment; implement worker training programs, administrative controls, and medical monitoring	Raynaud's phenomenon of occupational origin, or vibration white finger disease
Hot environments	Sliding scale limits based on environmental and metabolic heat loads	Heat-induced illnesses
Noise	85 dBA† TWA; 115 dBA ceiling	Hearing damage
Radon progeny in underground mines (See Radiation in Section A)	Ca; 1.0 WLM/year with average workshift concentration $\leq$1/12 of 1.0 WL (or 0.083 WL)	Lung cancer
Radiofrequency (RF) sealers and heaters	Various recommendations for safe work practices and technologic improvements to reduce adverse health effects from unwarranted exposure to RF energy	Adverse thermal and nonthermal effects on tissue cells
Ultraviolet radiation	For spectral region of 315-400 nm: for periods >1,000 sec, 1.0 mW/cm^2; for periods $\leq$1,000 sec, 1,000 mW.sec/cm^2 (1.0 J/cm^2). For spectral region of 200-315 nm: consult criteria document	Skin and eye effects

*Consult primary sources in Section A for definitive information.
†Abbreviations: dBA = decibels measured on the A scale; RF = radiofrequency; TWA = time-weighted average; WL = working level; WLM = working level month.

Table 3.—NIOSH recommended safety and health standards for industries, processes, and work environments

Industry, process, or work environment	NIOSH recommendation
Animal rendering	RELs for specific hazards are applicable to reduce the risk of mechanical injuries, burns, heat stress, infections from biologic agents, and chemical hazards
Chromite ore processing and chromate pigment manufacturing*	RELs for specific hazards are applicable to reduce the risk of cancer
Coal gasification	RELs for specific hazards are applicable to reduce the risk of occupational disease and physical injuries; recommendations are given for engineering controls, work practices, personal protective equipment, and medical surveillance
Coal liquefication	RELS for specific hazards are applicable to reduce the risk of occupational disease and physical injuries; recommendations are given for engineering controls, work practices, personal protective equipment, and medical surveillance
Confined spaces, working in	Various recommendations, including a permit system to prevent worker injury and death
Electronic component manufacturing	Develop a more comprehensive data base on the chemical and physical agents and ergonomic stresses encountered in the manufacture of electronic components
Elevated workstations, emergency egress	Various recommendations concerning means and availability of egress
Excavations, from working in	Many recommendations concerning safety standards for excavations to prevent worker injury and death
Fluorocarbon polymers, decomposition products of	Various recommendations emphasizing good work practices, engineering controls, and medical management to reduce the risk of lung effects and polymer fume fever
Foundry work	Various recommendations emphasizing good work practices, engineering controls, and medical monitoring to reduce the risk of cancer, respiratory disease, heat-induced illness, noise-induced hearing loss, vibration-induced disorders, eye injuries, and traumatic and ergonomic injuries

(Continued)

*REL adopted during OSHA hearings (Appendix II).

Table 3 (Continued).—NIOSH recommended safety and health standards for industries, processes, and work environments

Industry, process, or work environment	NIOSH recommendation
Hazardous materials, working with	Complete system for identifying occupationally hazardous materials
Hazardous energy control during maintenance and servicing (Lockout/Tagout)	Lockout/Tagout guidelines for work practices, and recommendations for controlling hazardous energy during maintenance and servicing activities
Logging from felling to first haul	Extensive work practice and personal protection recommendations
Mechanical power presses, working with	Various recommendations for preventing injuries and amputations resulting from mechanical power presses, specifically those operated by foot or dual palm-button controls
Oil and gas well drilling (land-based)	Comprehensive recommendations for safe work practices and technological improvements
Paint and allied coatings manufacture	Various recommendations for the handling of raw materials and finished products; dispersion of pigment or resin particles; filling; laboratory functions; and thinning, tinting, and shading
Precast concrete, production of	Various recommendations for safe work practices and worker safety
Tobacco smoke	Reduce exposures to the lowest feasible concentration by eliminating tobacco use from the workplace or restricting smoking to designated separate, enclosed areas with separate ventilation.
Welding, brazing, and thermal cutting	Existing RELs for specific chemical and physical agents are applicable to reduce the risk of cancer, respiratory disease, heat-induced illness, noise-induced hearing loss, eye injuries, traumatic and ergonomic injuries; consider these RELs upper boundaries of exposure; implement recommendations emphasizing good work practices, engineering controls, and medical monitoring

APPENDIX I

CLASSES OF CHEMICALS

Several RELs apply to entire classes of chemicals. Appendix I lists these classes (e.g., alkanes, ketones, etc.) and the individual members of each that are listed by RTECS. Table 1 of Section B refers the reader to Appendix I whenever a class name is mentioned. Readers may use the class name to locate source documents in Section A.

ALDEHYDES

Acetaldehyde
Acrolein
Butyraldehyde
Crotonaldehyde
Glutaraldehyde
Glyoxal
Malonaldehyde
Paraformaldehyde
Propiolaldehyde
Propionaldehyde
Valeraldehyde

ALKANES

Heptane
Hexane, all isomers
Octane
Pentane

ANTIMONY

Elemental antimony and antimony compounds (not including stibine, SbH^3) include but are not limited to the following compounds:

Acetic acid, antimony salt
Acetic acid, bis(nitrilotri-, antimony complex
Acetic acid, (isopropylenedinitrilo)tetra-, antimony sodium salt, dihydrate
Acetic acid, ((2-stibonophenyl)thio)-
Acetic acid, ((2-stibonophenyl)thio)-, calcium salt
Acetic acid, ((2-stibonophenyl)thio)-, diethanolamine salt
Acetic acid, ((2-stibonophenyl)thio)-, sodium salt
Aniline, oxo(tartrato)antimonate(1-)
m-Anisidine antimonyl tartrate
o-Anisidine antimonyl tartrate
p-Anisidine antimonyl tartrate
Antimonate(5-), bis(4,5-dihydroxy-m-benzene-disulfonato(4-))-, pentasodium, heptahydrate
Antimonate(2-), bis(μ-(2,3-dihyroxybutane-dioato(4)-O(sup 1), O(sup 2), O(sup 3), O(sup 4))di-, stereoisomer, dihydrogen, compound with piperazine (1:1)
Antimonic acid, sodium salt
Antimonic acid, tungsten salt
Antimony, bis(trichloro-, compound with 1 mol of octamethyl pyrophosphoramide
Antimony (III) chloride
Antimony (V) chloride
Antimony, dichlorotriphenyl-
Antimony (III) fluoride (1:3)
Antimony lactate
Antimony oxide
Antimony (V) pentafluoride
Antimony pentasulfide
Antimony pentoxide
Antimony potassium dimethyl cysteino tartrate
Antimony potassium tartrate
D-Antimony potassium tartrate
DL-Antimony potassium tartrate
L-Antimony potassium tartrate
meso-Antimony potassium tartrate
Antimony sodium dimethylcysteino tartate
Antimony (III) sodium gluconate
Antimony sodium tartrate
Antimony (V) sodium tartrate
Antimony (III) sulfate (2:3)
Antimony tartrate

Antimony trisulfide
Benzenamine, 4-stibino-, monosodium salt
Benzenestibonic acid, p-acetamido-, sodium salt
Benzenestibonic acid, p-amino-, compound with urea (3:1)
1,3,2-Benzodioxastibole, 2-hydroxy-
1,3,2-Dithiastibolane-4,5-dicarboxylic acid, 2,2'-((1,2-dicarboxy-1,2-ethanediyl)bis(thio)), hexasodium salt
Emetine antimony iodide
D-Gluconic acid, 2,4:2',4'-O-(oxydistibylidyne)bis-, Sb,Sb'-dioxide, trisodium salt, nonahydrate
Neostam
m-Phenetidine antimonyl tartrate
o-Phenetidine antimonyl tartrate
p-Phenetidine antimonyl tartrate
Phenol, m-amino-, oxo(tartrato) antimonate(1-)-
Phenol, o-amino-, oxo(tartrato) antimonate(1-)-
Phenol, p-amino-, oxo(tartrato) antimonate(1-)-
Phosphonic acid, (α-hydroxy-p-methoxybenzyl)-, diethyl ester, ester with bis(2-chloro propyl) antimonate (III)
1,3-Propanediol, 2-(hydroxymethyl)-2-propyl-, cyclic ester with antimonic acid
5-Quinolinesulfonic acid, 8,8'-((hydroxystibylene) bis(oxy))bis(7-formyl-, disodium salt
Sodium antimonyl adonitol
Sodium antimonyl D-arabitol
Sodium antimonyl biscatechol
Sodium antimonyl tert-butyl catechol
Sodium antimonyl catechol thiosalicylate
Sodium antimonyl citrate
Sodium antimonyl erythritol
Sodium antimonyl D-funcitol
Sodium antimonyl gluco-guloheptitol
Sodium antimonyl glycerol
Sodium antimonyl D-mannitol
Sodium antimonyl 2,5-methylene D-mannitol
Sodium antimonyl 2,4-methylene D-sorbitol
Sodium antimonyl xylitol
Sodium mannitol antimonate
Sodium stibinivanadate
Stibine oxide, triphenyl-
Stibine sulfide, triphenyl-
Stibine, trimethyl-
Stibine, triphenyl-
Stibine, tri-2-pyridyl-
Stibine, tris((1,2-dicarboxyethyl)thio)-, hexalithium salt
Stibine, tris(dodecylthio)-
Stibonium, tetramethyl-, iodide
Succinic acid, mercapto-, thioantimonate (III), dilithium salt, nonahydrate
2,4,10,12-Tetraoxa-6,16,17,18-tetraaza-3,11-distibatricyclo(11.3.1.1(sup 5,9))octadeca-1(17),5,7,9(18),13,15-hexaene, 3,11-dihydroxy
2,4,10,12-Tetraoxa-6,16,17,18-tetraaza-3.11-distibatricyclo(11.3.1.1(sup 5,9))octadeca-1(17),5,7,9(18),13,15-hexaene-8,14-dimethanol, 3,11-dihydroxy
m-Toluidine antimonyl tartrate
o-Toluidine antimonyl tartrate
p-Toluidine antimonyl tartrate
Urea antimonyl tartrate

ARSENIC, INORGANIC

Elemental arsenic and all of its inorganic compounds include but are not limited to the following compounds:

Ammonium vanado-arsenate
Aniline, arsenate
Arsenenic acid, sodium salt
Arsenic acid
Arsenic acid, (03-As-H)
Arsenic acid, calcium salt (2:3)
Arsenic acid, diammonium salt
Arsenic acid, disodium salt
Arsenic acid, disodium salt, heptahydrate
Arsenic acid, hemihydrate
Arsenic acid, lead salt
Arsenic acid, lead (2+) salt(1:1)
Arsenic acid, magnesium salt
Arsenic acid, monopotassium salt
Arsenic acid, sodium salt
Arsenic (V) acid, trisodium salt, heptahydrate (1:3:7)
Arsenic (II) bromide
Arsenic chloride
Arsenic iodide
Arsenic pentoxide
Arsenic sulfide
Arsenic triiodide mixed with mercuric iodide
Arsenic trioxide
Arsenic trioxide mixed with selenium dioxide (1:1)
Arsenious acid, calcium salt
Arsenious acid, copper (II) salt (1:1)
Arsenious acid, monosodium salt
Arsenious acid, potassium salt
Arsenious acid, sodium salt
Arsenious acid, zinc salt

Arsenopyrite
Arsenous trifluoride
Arsonic acid, disodium salt, heptahydrate
Bordeauxarsenite
Caesium arsenate
Iron (II) arsenate (3:2)
Iron (III) arsenate (1:1)
Iron (III) o-arsenite, pentahydrate
Lead (II) arsenite
Mercury (II) o-arsenate
Potassium hexafluoroarsenate
Sodium hexafluoroarsenate
Strontium arsenite
Zinc arsenate

ASBESTOS

Asbestos is defined as chrysotile, crocidolite, amosite (cummingtonite-grunerite), anthophyllite, tremolite, and actinolite. The nonasbestiform habits of the serpentine minerals antigorite and lizardite, and the amphibole minerals contained in the series cummingtonite-grunerite, tremolite-ferroactinolite, and glaucophane-riebeckite shall also be included provided they meet the criteria for a fiber as ascertained on a microscopic level. A fiber is defined as a particle with an aspect ratio of 3:1 or larger and a length greater than 5 μm.

Actinolite
Amosite (cummingtonite-grunerite)
Anthophyllite
Chrysotile
Crocidolite
Tremolite

BERYLLIUM

Elemental beryllium and beryllium compounds include but are not limited to the following compounds:

Acetic acid, beryllium salt
Bertrandite
Beryl
Beryllium aluminum alloy
Beryllium, bis(carbonato(2-))dihydroxytri-
Beryllium carbonate (1:1)
Beryllium chloride
Beryllium chloride, tetrahydrate
Beryllium fluoride
Beryllium, hexakis(μ-acetato)-μ(sup 4)-oxotetra-
Beryllium hydrogen phosphate (1:1)
Beryllium hydroxide
Beryllium manganese zinc silicate
Beryllium, compound with niobium (12:1)
Beryllium nitrate
Beryllium oxide
Beryllium oxyfluoride
Beryllium sulfate (1:1)
Beryllium sulfate, tetrahydrate (1:1:4)
Beryllium, compound with titanium (12:1)
Beryllium, compound with vanadium (12:1)
Copper alloy, Cu,Be
Copper alloy, Cu,Be,Co
Lactic acid, beryllium salt
Nickel alloy, Ni,Be
Silicic acid, beryllium salt
Silicic acid, beryllium zinc salt
Sodium beryllium malate
Sodium beryllium tartrate

CADMIUM

Cadmium and its compounds include but are not limited to the following compounds:

Acetic acid, (ethylenedinitrilo)tetra-, cadmium (II) complex
Aerosol of thermovacuum cadmium
Cadmium (II) acetate
Cadmium, bis(diethyldithiiocarbamato)-
Cadmium, bis(1-hydroxy-2-(1h)-pyridinethionato)-
Cadmium chloride
Cadmium chloride, dihydrate
Cadmium chloride, monohydrate
Cadmium compounds
Cadmium fluoborate
Cadmium fluoride
Cadmium fluorosilicate
Cadmium lactate
Cadmium nitrate
Cadmium (II) nitrate, tetrahydrate (1:2:4)
Cadmium oxide
Cadmium oxide fume
Cadmium phosphate
Cadmium selenide sulfide
Cadmium sulfate (1:1)
Cadmium sulfate, hydrate
Cadmium sulfate (1:1), hydrate (3:8)
Cadmium sulfate tetrahydrate

Cadmium sulfide
Cadmium sulfide mixed with zinc sulfide (1:1)
Cadmium sulfide mixed with zinc sulfide (5:95)
Cadmium sulfide mixed with zinc sulfide (8:92)
Cadmium telluride
Cadmium thionein
Carbonic acid, cadmium salt
Imidazole, 2,4,5-tribromo, cadmium salt (2:1)
Kromad
Lauric acid, barium cadmium salt
Octadecanoic acid, cadmium salt
Octanoic acid, cadmium salt (2:1)
Phosphorous acid, bis(2-ethylhexyl) ester, cadmium salt
Stearic acid, barium cadmium salt (4:1:1)
Succinic acid, cadmium salt (1:1)

CHROMIUM, HEXAVALENT

Hexavalent chromium includes chromium in all materials in the +6 state.

COAL TAR PRODUCTS

Coal tar
Coal tar pitch
Creosote

CHLOROETHANES

1,1-Dichloroethane
1,2-Dichloroethane
Hexachloroethane
Monochloroethane
Pentachloroethane
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane

COBALT

Cobalt and all cobalt-containing compounds include but are not limited to the following compounds:

- Cemented tungsten carbide:
  - Tungsten carbide, mixed with cobalt (85%:15%)
  - Tungsten carbide, mixed with cobalt (92%:8%)
  - Tungsten carbide, mixed with cobalt and titanium (78%:14%:8%)

DIISOCYANATES

Dicyclohexylmethane 4,4'-diisocyanate (hydrogenated MDI)
Hexamethylene diisocyanate (HDI)
Isophorone diisocyanate (IPDI)
Methylene bisphenyl isocyanate (MDI)
Naphthalene diisocyanate (NDI)
Toluene diisocyanate (TDI), all isomers

DINITROTOLUENES

Dinitrotoluene, all isomers
2,4-Dinitrotoluene
2,6-Dinitrotoluene

FLUORIDES, INORGANIC

Inorganic fluorides are defined as compounds of fluoride that (1) are inorganic solids at normal workroom temperatures (20°C), (2) are without radioactive elements, and (3) have components that do not have more restrictive exposure limits than fluoride. The standard also applies to any gaseous fluorides emitted simultaneously with particulate fluorides as defined above.

GLYCIDYL ETHERS

Allyl glycidyl ether (AGE)
Butyl glycidyl ether (BGE)
Di(2,3-epoxypropyl ether) (DGE)
Isopropyl glycidyl ether (IGE)
Phenyl glycidyl ether (PGE)

GLYCOL ETHERS

Ethylene glycol monobutyl ether
Ethylene glycol monobutyl ether acetate
Ethylene glycol monoethyl ether
Ethylene glycol monoethyl ether acetate
Ethylene glycol monomethyl ether
Ethylene glycol monomethyl ether acetate

HYDRAZINES

1,1-Dimethylhydrazine
1,2-Dimethylhydrazine
Hydrazine
Methylhydrazine
Phenylhydrazine

Salts of the previous chemicals (e.g., sulfates, hydrochlorides, and hydrobromides) formed by the addition of acids.

HYDROGEN CYANIDE AND CYANIDE SALTS

Calcium cyanide
Hydrogen cyanide
Potassium cyanide
Sodium cyanide

KETONES

Acetone
Cyclohexanone
Diacetone alcohol
Diisobutyl ketone
Isophorone
Mesityl oxide
Methyl amyl ketone
Methyl butyl ketone
Methyl ethyl ketone
Methyl isoamyl ketone
Methyl isobutyl ketone
Methyl propyl ketone

LEAD, INORGANIC

Inorganic lead includes lead oxides, metallic lead, and lead salts (including organic salts such as lead soaps but excluding lead arsenate).

MERCURY COMPOUNDS

Mercury compounds include elemental mercury, all inorganic mercury compounds, and organic mercury compounds other than ethyl and methyl mercury compounds.

Acetic acid, (3-((3-(Acetoxymercuri)-2-ethoxypropyl)carbamoyl)-2-Naphthyloxy)-
Acetic acid, (ethylenedinitrilo)tetra-, mercury (II) complex
Ammonium, (bis(2-hydroxy-3,5,6-trichlorophenyl) methoxy)dimethyl(2-hydroxyethyl)-, phenylmercurate
Ammonium, (bis(2-hydroxy-3,5,6-trichlorophenyl) methoxy)tris(2-hydroxyethyl)-, phenylmercurate
Ammonium, mercuribis(diethyl(2,2-dimethyl-4-dithiocarboxyamino)butyl-, dichloride
Ammonium, tris(2-hydroxyethyl)(phenylmercurio), lactate
Aniline, 2-(acetoxymercuri)-4-nitro-
Aniline, 2(hydroxymercuri)-4-nitro-
Barbituricc acid, 5-(2-hydroxy-3-hydroxymercur) propyl-5-phenyl
2H-1-benzopyran-3-carboxylic acid, 8-(3-(hydroxymercuri)-2-methyoxypropyl)-2-oxo-, sodium salt, compound with theophylline (1:1)
3H-2,1-benzoxamercurole, 7-nitro-3-oxo
Boric acid, phenylmercury deriv.
Boric acid, phenylmercury silver deriv.
Caffeine, 8-(3-(hydroxymercuri)-2-methoxypropoxy)-
Calo-clor
Chromium, hexacarbonyldi-π-cyclopentadienyl-μ-mercuriodi-
Cobalt(2+), bis(1,2-ethanediamine-N,N')-(T-4)-tetrakis(thiocyanato-s)mercuratte(2-) (1:1), homopolymer
Copper(2+), bis(ethylenediamine)-, tetrakis (thiocyanato)mercurate(2-), polymers
Fluorescein, 2',7'-dibromo-4'-(hydroxymercurio)-, disodium salt
Iron(2+), bis(1,2-ethanediamine-N,N')-, (T-4)-tetrakis(thiocyanato-N)mercurate (2-) (1:1), homopolymer
Malonic acid, (2-hydroxy-3-hydroxymercuri) propyl(phenyl)-, sodium salt
Mercurate(1-), acetatophenyl-, ammonium salt
Mercurate(4-), bis(N,N-bis(carboxymethyl) glycinato(3-)-N,O,O',O")-, tetrahydrogen
Mercurate(1-), butyl(mercaptoacetato(2-)-O,S-), sodium
Mercurate(1-)-, (3-(4-(carboxylatomethoxy) phenyl)-2-hydroxypropyl)hydroxy-, sodium
Mercurate(2-), ((cyclohexylenedinitrilo) tetracetato)-
Mercurate(1-), ethyl(mercaptoacetato(2-)-O,S)-, potassium
Mercurate(1-), (mercaptoacetato(2-)-O,S)methyl-, sodium
Mercurate(2-), tetraiodo-, dipotassium
Mercury
Mercury, (3-acetamido-2-methoxypropyl)chloro-
Mercury, acetato(5-(2-amino-2-carboxyethyl)-2-hydroxyphenyl)-
Mercury, acetato(2-amino-5-carboxyphenyl)-
Mercury, acetato(4-amino-2-carboxyphenyl)-
Mercury, acetato(4-amino-3-carboxyphenyl)-
Mercury, acetato(5-amino-2-hydroxyphenyl)-

Mercury, acetato(o-aminophenyl)-
Mercury, (acetato)(p-aminophenyl)-
Mercury, acetato(2-amino-5-sulfophenyl)-
Mercury, acetato(3-benzamido-2-methoxypropyl)-
Mercury, (acetato)bis(heptyloxy)phosphinyl-
Mercury, (acetato)bis(hexyloxy)phosphinyl-
Mercury, acetato(3-bromo-2-carboxyphenyl)-
Mercury, acetato(3-bromo-6-carboxyphenyl)-
Mercury, acetato(3-bromo-4-hydroxyphenyl)-
Mercury, acetato(3-bromo-6-hydroxyphenyl)-
Mercury, acetato(3-carboxy-4-((carboxymethyl) amino)phenyl)-
Mercury, acetato(2-carboxy-3-chlorophenyl)-
Mercury, acetato(3-carboxy-4-((cyanomethyl) amino)phenyl)-
Mercury, acetato(2-carboxy-3-cyanophenyl)-
Mercury, acetato(2-carboxy-4,6-dinitro-3-hydroxyphenyl)-
Mercury, acetato(3-carboxy-4-(ethylamino)phenyl)-
Mercury, acetato(p-(carboxyformamido)phenyl)-
Mercury, acetato(3-carboxy-6-hydroxyphenyl)-
Mercury, acetato(2-carboxy-3-iodophenyl)-
Mercury, acetato(2-carboxy-3-mercaptophenyl)-
Mercury, acetato(3-carboxy-4-(methylamino) phenyl)-
Mercury, acetato(2-carboxy-3-nitrophenyl)-
Mercury, acetato(2-carboxy-5-nitrophenyl)-
Mercury, acetato(2-carboxy-6-nitrophenyl)-
Mercury, (acetato)(diethoxyphosphinyl)-
Mercury, acetato(p-(diethylamino)phenyl)-
Mercury, acetato(5-(dimethylamino)-2-hydroxyphenyl)-
Mercury, acetato(p-(dimethylamino)phenyl)-
Mercury, acetato(2-(dimethylamino)-5-sulfophenyl)-
Mercury, acetato(3-(2-(1,3-dimethyl-2,6-dioxo-1,2,3,6-tetrahydro-7H-purin-7-yl)acetamido)-2-ethoxypropyl)-
Mercury, acetato(3-(2-(1,3-dimethyl-2,6-dioxo-1,2,3,6-tetrahydro-7H-purin-7-yl)acetamido)-2-methoxypropyl)-
Mercury, acetato(3-(2-(1,3-dimethyl-2,6-dioxo-1,2,3,6-tetrahydro-7H-purin-7-yl)acetamido)-2-propoxypropyl)-
Mercury, (acetato)ethyl-
Mercury, acetato(3-formyl-4-hydroxyphenyl)-
Mercury, acetato(2-hydroxy-5-iodophenyl)-
Mercury, acetato(4-hydroxy-3-methoxyphenyl)-
Mercury, acetato(2-hydroxy-5-methylphenyl)-
Mercury, acetato(4-hydroxy-3-methylphenyl)-
Mercury, acetato(2-hydroxy-5-nitrophenyl)-
Mercury, acetato(2-hydroxy-5-nitrosophenyl)-
Mercury, acetato(2-hydroxy-5-sulfophenyl)-
Mercury, (acetato)(2-methoxyethyl)-
Mercury, acetato(2-methoxy-3-(1-naphthamido) propyl)-
Mercury, acetato(2-methoxy-3-(2,4,6-trioxo-(1H,3H,5H)-pyrimidin-3-yl)propyl)-
Mercury, acetato(2-methoxy-3-(2,4,6-trioxo-(1H,3H,5H)-pyrimidin-5-yl)propyl)-
Mercury, (acetato)methyl-
Mercury, (acetato)(o-nitrophenyl)-
Mercury, (acetato)(phenyl)-
Mercury, acetato(3-sulfophenyl)-
Mercury, (acetato)(1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-8-yl)
Mercury, acetato(3-(1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-7-yl)-2-methoxypropyl)-
Mercury, (acetato)(2,3,5,6-tetramethylphenyl)-
Mercury, acetoxy(2-acetamido-5-nitrophenyl)-
Mercury acetylide
Mercury amide chloride
Mercury, (3-amino-4-hydroxyphenyl)chloro-
Mercury, bis(4-amino-3-carboxyphenyl)-
Mercury, (1,2-benzenediolato-O)phenyl-
Mercury, bis(3-bromo-4-hydroxyphenyl)-
Mercury, bis(5-bromo-2-hydroxyphenyl)-
Mercury, bis(5-chloro-2-hydroxyphenyl)-
Mercury(II), bis(L-cysteinato)-
Mercury, bis(O,O-dibutylphosphorodithioato-s)-
Mercury, bis(diethyldithiocarbamato)-
Mercury(2-), bis(4-(dithiocarboxy)-1-piperazineacetato(2-))-, disodium
Mercury, bis(formylmethyl)-
Mercury, bis(4-hydroxy-3-nitrophenyl)-
Mercury, bis(o-hydroxyphenyl)-
Mercury, bis(3-hydroxy-1-propynyl)-
Mercury(II), bis(3-mercapto-dl-valinato)-
Mercury(2-), bis(dl-3-mercaptovalinato)dichloro-
Mercury(II), bis(dl-methionato)-
Mercury, bis(4-morpholinecarbodithioato)-
Mercury, bis(trifluoromethylthio)-
Mercury, bis(1,3,7-trimethyl-8-xanthinyl)-
Mercury(I) bromide (1:1)
Mercury(II) bromide (1:2)
Mercury, bromo(3',6'-dihydroxy-3-oxospiro (isobenzofuran-1(3H),9'-xanthen-4'yl))-, sodium salt
Mercury, bromohexyl
Mercury, bromo(2-hydroxyethyl)-
Mercury, bromo(methoxycarbonyl)-
Mercury, bromophenyl-
Mercury, butylchloro-
Mercury, (3-butyramido-2-methoxypropyl)chloro-

Mercury, (butyrato)phenyl-
Mercury, (3-(α-carboxy-o-anisamido)-2-(2-hydroxyethoxy)propyl)hydroxy-, monosodium salt
Mercury, (3-(α-carboxy-m-anisamido)-2-hydroxypropyl)hydroxy-
Mercury, (3-(α-carboxy-o-anisamido)-2-hydroxypropyl)hydroxy-
Mercury, (3-(α-carboxy-p-anisamido)-2-hydroxypropyl)hydroxy-
Mercury, (3(α-carboxy-o-anisamido)-2-methoxypropyl)hydroxy-, monosodium salt
Mercury, (3(α-carboxy-o-anisamido)-2-methoxypropyl)hydroxy-, sodium salt, compound with theophylline(1:1)
Mercury, (2-carboxy-5-chlorophenyl)chloro-
Mercury, (3-carboxy-4-hydroxyphenyl)hydroxy-
Mercury, (3-carboxy-4-hydroxy-6-sulfophenyl) hydroxy-
Mercury, (3-(o-(carboxymethoxy)benzamido)-2-methoxypropyl)(1,2--dicarboxyethylthio)-, trisodium salt
Mercury, (3-(o-(carboxymethoxy)benzamido)-2-methoxypropyl)hydroxy-, monosodium salt, compound with theophylline
Mercury, (4-(carboxymethoxy)-3-chlorophenyl) (5,5-diethyl-2,4,6-(1H,3H,5H)-pyrimidinetrionato-O(sup 2))-, monosodium salt
Mercury, (carboxymethylthio)(3-(1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-7-yl)-2-methoxypropyl)-
Mercury, (p-carboxyphenyl)chloro-
Mercury, (o-carboxyphenyl)hydroxy-
Mercury, (p-carboxyphenyl)hydroxy-
Mercury, (o-carboxyphenyl)hydroxy-, sodium salt
Mercury, (p-carboxyphenyl)hydroxy-, sodium salt
Mercury, ((o-carboxyphenyl)thio)ethyl-, sodium salt
Mercury, ((o-carboxyphenyl)thiolato)phenyl-
Mercury, (3-(3-(3-carboxypropionyl)ureido)-2-methoxypropyl)hydroxy-
Mercury, (3-(3-carboxy-2,2,3-trimethylcyclo-pentanecarboxamido)-2-methoxypropyl) (hydrogen mercaptoacetato)-
Mercury, (3-(3-carboxy-2,2,3-trimethylcyclo-pentanecarboxamido)-2-methoxypropyl)hydroxy-, mixture with theophylline
Mercury, (3-(((3-carboxy-2,2,3-trimethylcyclo-pentyl)carbonyl)amino)-2-methoxypropyl) (mercaptoacetato-s)-, disodium salt
Mercury(I) chloride
Mercury(II) chloride
Mercury, chloro(3-benzamido-2-methoxypropyl)-
Mercury, chloro(2-(3-bromopropionamido) cyclohexyl)-, (E)-
Mercury, chloro(2-chlorovinyl)-
Mercury, chloro(dibutxoyphosphinyl)-
Mercury, chloro(diisopropoxyphosphinyl)-
Mercury, chloro(4-(dimethylamino)-2-sulfophenyl)-
Mercury, chloro(3-(2,2-dimethylpropionamido)-2-methoxypropyl
Mercury, chloro(3-(2,4-dioxo-1-imidazolidinyl)-2-methoxypropyl
Mercury, chloro((3-(2,4-dioxo-3-imidazolidinyl)-2-methoxy)propyl)-
Mercury, chloro((3-(2,4-dioxo-5-imidazolidinyl)-2-methoxy)propyl)-
Mercury, chloro((3-(2,4-dioxo-1-methyl-3-imidazolidinyl)-2-methoxy)propyl)-
Mercury, chloro((3-(2,4-dioxo-3-methyl-1-imidazolidinyl)-2-methoxy)propyl)-
Mercury, chloro((3-(2,4-dioxo-3-methyl-5-imidazolidinyl)-2-methoxy)propyl)-
Mercury, chloroethyl-
Mercury, chloro(2-furyl)-
Mercury, chloro(2-hexanamidocyclohexyl)-, (E-)
Mercury, chloro(2-hydroxy-3,5-dinitrophenyl)-
Mercury, chloro(4-((2-hydroxy-1-naphthalenyl)azo) phenyl)-
Mercury, chloro(o-hydroxyphenyl)-
Mercury, (3-chloro-4-hydroxyphenyl)hydroxy-
Mercury, (3-chloro-6-hydroxyphenyl)hydroxy-
Mercury, chloro(1-hydroxy-4-sulfo-2-naphthyl)-
Mercury, chloro(3-methoxybicyclo(2.2.1)hept-2-yl)-
Mercury, chloro(trans-2-methoxycyclooctyl)-
Mercury, chloro(2-methoxyethyl)-
Mercury, chloro(2-methoxy-3-(1-naphthamido) propyl)-
Mercury, chloro(2-(3-methoxypropionamido) cyclohexyl)-
Mercury, chloro(2-methoxy-3-propionamidopropyl)-
Mercury, chloro(2-methoxy-3-ureidopropyl)-
Mercury, chloro(2-methoxy-3-valeramidopropyl)-
Mercury, chloromethyl-
Mercury, chloropentyl-
Mercury, chloro(n-phenylformamido)-
Mercury, chloropropyl-
Mercury, chloro-3-pyridyl-
Mercury (II) cyanide
Mercury, (3-cyanoguanidino)methyl-
Mercury, cyanohydroxy-
Mercury, cyanomethyl-
Mercury, dianilino-

Mercury, dibenzyl-
Mercury, (2,4-dibromo-6-((p-bromophenyl) carbamoyl)phenoxy)phenyl-
Mercury, dibutyl-
Mercury, di-sec-butyl-
Mercury, ((1,2-dicarboxyethyl)thio)(3-(1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-7-yl)-2-methoxypropyl
Mercury, (2,5-dichloro-3,6-dihydroxy-p-benzoquinolato)-
Mercury, diheptyl
Mercury, (dihydrogen 7,12-bis(1-hydroxyethyl)-3,8,13,17-tetramethyl-2,18-porphinedipropionate (2))-, disodium salt
Mercury, (dihydrogen phosphato)methyl-
Mercury, (dihydroxyphenyl)phenyl-
Mercury, ((dihydroxypropyl)thio)methyl-
Mercury, diisopentyl-
Mercury, diisopropyl-
Mercury, diphenyl-
Mercury, dipropyl-
Mercury, di-3-pyridyl-
Mercury, (dodecylthio)phenyl-
Mercury, ethyl(n-ethyl-p-toluenesulfonamido)-
Mercury, ethyl(1,4,5,6,7,7-hexachloro-5-norbornene-2,3-dicarboximidato)-
Mercury, ethyl(phosphato(1))-
Mercury, ethyl((p-sulfophenyl)thio)-, sodium salt
Mercury, ethyl)p-toluenesulfonanilidato)-
Mercury, ethyl(toluenesulfonato)-
Mercury fulminate
Mercury, (1,2,3,4,7,7-hexachlorobicyclo(2.2.1) hept-2-ene-5,6-dicarboximido)phenyl-
Mercury, (1,4,5,6,7,7-hexachloro-5-norbornene-2,3-dicarboximido)methyl-
Mercury, hydroxy(3-(5,5-diethyl-2,4,6-trioxo-(1H,3H,5H)-pyrimidino)-2-isopropoxypropyl)-
Mercury, hydroxy(3-(5,5-diethyl-2,4,6-trioxo-(1H,3H,5H)-pyrimidino)-2-methoxypropyl)-
Mercury, hydroxy(6-hydroxy-2,7-diiodo-3-oxo-9-(o-sulfophenyl)-3H-xanthen-5-yl)-, disodium salt
Mercury, hydroxy(4-hydroxy-3-nitrophenyl)-
Mercury, hydroxy(4-hydroxy-3-nitrrophenyl)-, monosodium salt
Mercury, hydroxy(8-hydroxy-5-quinolinesulfato)-
Mercury, hydroxyisopropyl-
Mercury, (4-hydroxy-5-methoxy-2-nitro-m-phenylene)bis(acetato-, and acetato(hyrdoxy-3-methoxy-6-nitro)mercury
Mercury, hydroxy(2-methoxy-3-(2,4,6-trioxo-(1H, 3H, 5H)-pyrimidino)propyl)-, sodium salt
Mercury, hydroxy(2-methoxy-3-(2,4,6-trioxo-(1H, 3H, 5H)-pyrimidin-1-yl)propyl)-
Mercury, hydroxy(2-methoxy-3-(2,4,6-trioxo-(1H, 3H, 5H)-pyrimidin-5-yl)propyl)-
Mercury, hydroxy(2-methoxy-3-(2,4,6-trioxo-(1H, 3H, 5H)-pyrimidin-5-yl)propyl)-, sodium salt
Mercury, hydroxymethyl-
Mercury, hydroxyphenyl-
Mercury, (2-hydroxyphenyl)hydroxy-
Mercury(II), iminodiacetato-
Mercury(I) iodide
Mercury(II) iodide
Mercury, iodo-p-tolyl-
Mercury, (methanethiolato)methyl-
Mercury, (2-methoxyethyl)(trihydrogen orthosilicato)-
Mercury, methyl-, n-bis(p-tolylsulfonyl)amido-
Mercury, methyl-, dimercaptopropanol
Mercury(1+), methyl-, ion
Mercury, methyl(pentachlorophenoxy)-
Mercury, methyl(8-quinolinolato)-
Mercury, methyl(thioacetamido)-
Mercury, nitratophenyl-
Mercury, nitratophenyl-, compd. with hydroxyphenylmercury (1:1)
Mercury, (oleato)phenyl-
Mercury(II) oxide
Mercury, (pentachlorophenoxy)phenyl-
Mercury, (2,4-pentanedionato-o-o,o')phenyl-
Mercury, phenyl(propionyloxy)-
Mercury(II), phenyl(8-quinolinolato)-
Mercury, phenyl(thioacetamidato)-
Mercury, phenyl(p-toluenesulfonato)-
Mercury, phenylureido-
Mercury, (salicylato(2-))-
Mercury(I) sulfate
Methanearsonic acid, dimercury salt
2-Naphthalenesulfonic acid, 3,3'-methylenedi-, mercury salt
Nickel(2+), bis(1,2-ethanediamine-n,n')-, (T-4)-tetrakis(thiocyanato-s)mercurate(2-) (1:1), homopolymer
7-Oxa-8-mercurabicyclo(4.2.0)octa-1,3,5-triene,5-methyl-2-nitro
1,4-Oxamercurane
1,4-Oxathiane cmpd. with mercuric chloride
Pentanoic acid, 4-hydroxy-5-(hydroxymercuri)-2-phenyl-, sodium salt
Phosphine, tris(p-chlorophenyl)-, complex with mercuric chloride (2:1)

Phosphine, tris(p-dimethylaminophenyl)-, complex with mercuric chloride (2:1)
Phosphine, tris(p-methylphenyl)-, complex with mercuric chloride (2:1)
Phosphine, tris(p-methylthiophenyl)-, complex with mercuric chloride (2:1)
Phosphorous acid, tris(2-ethylhexyl)ester, complex with mercury(II) bromide (1:1)
Phosphorous acid, tris(2-ethylhexyl)ester, complex with mercury(II) chloride (1:1)
Potassium tetracyanomercurate(II)
1,2-Pyridazinedicarboximide, tetrahydro-4-(bromomercuri)-5-methoxy-
1,2-Pyridazinedicarboximide, tetrahydro-4-(chloromercuri)-5-methoxy-n-methyl-
Pyridinium, 1-hexadecyl-, bromide, mixture with chloro(2-hydroxyethyl)mercury
Salicylic acid, mercuridi-, disodium salt
Sinmel
Succinamic acid, n-((2-methoxy-3-((1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-7-yl) mercuri)propyl)carbamoyl)-
Succinamic acid, n-((2-methoxy-3-((1,2,3,6-tetrahydro-1,3-dimethyl-2,6-dioxopurin-7-yl) mercuri)propyl)carbamoyl)-, sodium salt
2-Thiophenecarboxylic acid, 5-((3(acetoxymercuri)-2-methoxypropyl)sulfamoyl)-, ethyl ester
2-Thiophenecarboxylic acid, 5-((3(acetoxymercuri)-2-methoxypropyl)carbamoyl)-
2-Thiophenesulfonamide, n-(3-(acetoxymercuri)-2-methoxypropyl
Uric acid, 9-(3-(hydroxymercuri)-2-methoxypropyl)-1,3,7-trimethyl
Zinc mercury chromate complex

MONOHALOMETHANES

Bromomethane
Chloromethane
Iodomethane
Methyl chloride
Methyl bromide
Methyl iodide

β-NAPHTHYLAMINE

2-Nitronaphthalene
N-Phenyl-β-naphthylamine

NIAX® CATALYST ESN

bis[2-(Dimethylaminoethyl) ether]
Dimethylaminopropionitrile
Ethylamine, 2,2'-oxybis(n,n-dimethyl-
Propionitrile, 3-(dimethylamino)-

NICKEL, INORGANIC

Inorganic nickel includes elemental nickel and all nickel compounds except organonickel compounds with a covalent carbon-nickel bond, such as nickel carbonyl.

Acetohydroxamic acid, n-fluoren-2-yl-, nickel(2+) complex
Benzoic acid, o-chloro-, nickel(II) salt
Carbamic acid, ethylenebis(dithio-, nickel(II) salt
Cinnamic acid, Nickel(II) salt
Iron oxide, chromium oxide and nickel oxide fume
Nickel
Nickel(II) acetate (1:2)
Nickel acetate tetrahydrate
Nickel alloy Ni,Be
Nickel, bis(2-benzoylbenzoato)bis(3-(1-methyl-2-pyrrolidinyl)pyridine)-trihydrate
Nickel, bis(dibutyldithiocarbamato)-
Nickel, bis(3,4-dichlorobenzoato)-
Nickel, bis(dimethyldithiocarbamato)-
Nickel, bis(triphenylphosphine)dichloro-
Nickel(II) carbonate (1:1)
Nickel(II) chloride (1:2)
Nickel(II) chloride, hexahydrate (1:2:6)
Nickel, dithiocyanatobis(triphenylphosphine)-
Nickel(II) fluoborate
Nickel(II) fluoride (1:2)
Nickel(II) fluosilicate (1:1)
Nickel gallium alloy
Nickel(II) hydroxide
Nickel(III) hydroxide
Nickel iron sulfide
Nickel(II) isodecyl ortho-phosphate(3:2)
Nickel(II) nitrate (1:2)
Nickel(II) nitrate, hexahydrate (1:2:6)
Nickel(II) oxide (1:1)
Nickel(III) oxide
Nickel potassium cyanide
Nickel refinery dust

Nickel selenide (Ni3-Se2)
Nickel(II) sulfamate
Nickel(II) sulfate (1:1)
Nickel(II) sulfate hexahydrate (1:1:6)
Nickel sulfide roasting (as Ni)
Nickel sulfide (3:2)
Nickel telluride
Nickel titanium oxide
Nickel(2+), tris(octamethylpyrophosphoramide)-, diperchlorate
2,4-pentanedione, nickel(II) deriv.
Perchloric acid, Nickel(2+) salt, hexahydrate

NITRILES

Acetone cyanohydrin
Acetonitrile
Acetonitrile, hydroxy-
Adiponitrile
n-Butyronitrile
Glycolonitrile
Isobutyronitrile
Lactonitrile, 2-methyl-
Malononitrile
Propanenitrile, 2-methyl-
Propionitrile
Succinonitrile
Tetramethyl succinonitrile

ORGANIC SOLVENTS

RELs exist for approximately 92 chemicals and mixtures that may be defined as organic solvents.

ORGANOTIN COMPOUNDS

Organotin compounds are defined as a group of compounds having at least one covalent bond between carbon and tin.

OXIDES OF NITROGEN

Nitric oxide
Nitrogen dioxide
Nitrogen monoxide
Nitrogen oxide

PESTICIDES, Groups I, II, and III

See Classification of Pesticides, in Appendix V.

POLYCHLORINATED BIPHENYLS

Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
Aroclor 1268
Aroclor 2565
Aroclor 4465
Biphenyl
Chlorodiphenyl
Decachlorodiphenyl
Kanechlor 300
Kanechlor 400
Kanechlor 500

REFINED PETROLEUM SOLVENTS

Benzin
Kerosene
Mineral spirits
Petroleum distillates
Petroleum ether
Petroleum gas (liquefied)
Petroleum hydrocarbon mixture: high naphthenic solvent
Petroleum 60 solvent
Petroleum 70 solvent
Rubber solvent
Stoddard solvent
VM&P naphtha

SYNTHETIC VITREOUS FIBERS (MANMADE MINERAL FIBERS)

Fibrous glass (including glass fibers and glass filaments)
Mineral wool (including mineral rock wool and slag wool)

THIOLS

Benzenethiol
1-Butanethiol
Cyclohexanethiol
1-Decanethiol
1-Dodecanethiol
Ethanethiol

1-Heptanethiol
1-Hexadecanethiol
1-Hexanethiol
Methanethiol
1-Nonanethiol
1-Octadecanethiol
1-Octanethiol
1-Pentanethiol
1-Propanethiol
1-Undecanethiol

TUNGSTEN

Ammonium paratungstate hexahydrate
Antimonic acid, tungsten salt
Phosphotungstic acid
Phosphotungstic acid , sodium salt
Tungsten
Tungsten, tris(acetonitrile)tricarbonyl-
Tungstic acid
Tungstic acid, disodium salt
Tungstic acid, sodium salt, dihydrate

TUNGSTEN (INSOLUBLE)

Tungsten
Tungsten carbide
Tungsten oxide

VANADIUM

Vanadium includes vanadium compounds (including all chemically combined forms of vanadium but not alloys, intermetallics, or vanadium carbide), and metallic vanadium (including the element alone, in alloys, or in intermetallics, such as ferrovanadium and vanadium-aluminum.

Ammonium vanadi-arsenate
Ammonium vanado-arsenate
Aniline vanadate, dihydrate
Copper tetravanadate
Mercury tetravanadate
Sodium hexavanadate
Sodium pyrovanadate
Sodium stibinivanadate
Sodium tetravanadate
Tetravanadate
Vanadate(3-), hexafluoro-, triammmonium salt
Vanadic acid, ammonium salt
Vanadic acid, monosodium salt
Vanadic acid, triisobutyl ester
Vanadic(II) acid, trisodium salt
Vanadious(4+) acid, disodium salt
Vanadium
Vanadium carbide
Vanadium dichloride
Vanadium, dichlorooxo-
Vanadium ore
Vanadium pentoxide (dust)
Vanadium pentoxide (fume)
Vanadium tetrachloride
Vanadium tribromide
Vanadium trichloride
Vanadium, trichlorooxo-
Vanadium trioxide

VINYL HALIDES

Vinyl bromide
Vinyl chloride
Vinyl fluoride
Vinylidene chloride
Vinylidene fluoride

WASTE ANESTHETIC GASES AND VAPORS

Chloroform
Enflurane
Fluroxene
Halothane
Methoxyflurane
Nitrous oxide
Trichloroethylene

APPENDIX II

CHEMICALS FOR WHICH NIOSH ADOPTED RELs DURING THE OSHA PEL PROJECT

This appendix lists chemicals for which NIOSH adopted RELs on the basis of their comments during the OSHA PEL Project. These RELs are included in Table 1 of Section B. For further information about these chemicals, readers should refer to OSHA's final rule on air contaminants in the *Federal Register* [54 FR 2641 (1989)] and to the 1988 NIOSH testimony on OSHA's proposed rule on air contaminants [NTIS No. PB-91-115-337].

Acetaldehyde*
Acetic acid
Acetic anhydride
Acetylsalicylic acid
Acrolein
Acrylic acid
Allyl alcohol
Allyl propyl disulfide
Aluminum
2-Aminopyridine
Amitrole
Ammonium chloride fume
Ammonium sulfamate
n-Amyl acetate
sec-Amyl acetate
o-Anisidine
p-Anisidine
α-Naphthylthiourea
Atrazine
Azinphos-methyl
Barium, soluble
Barium sulfate
Bismuth telluride, undoped
Bismuth telluride, Se-doped
Borates, tetra sodium salts
Boron oxide
Boron tribromide
Boron trifluoride*
Bromacil
Bromine
Bromine pentafluoride
Bromoform
Butane
n-Butyl acetate
sec-Butyl acetate
tert-Butyl acetate
Butyl acrylate
n-Butyl alcohol
sec-Butyl alcohol
tert-Butyl alcohol
Butylamine
n-Butyl lactate
o-sec-Butylphenol
p-tert-Butyltoluene
Calcium carbonate
Calcium cyanamide
Calcium hydroxide
Calcium oxide
Calcium silicate
Calcium sulfate
Camphor, synthetic
Caprolactam
Captafol
Captan
Carbofuran
Carbon tetrabromide
Carbonyl fluoride

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*Refer to Section A for additional NIOSH activity regarding this chemical.

Catechol
Cellulose
Cesium hydroxide
Chlordane
Chlorinated camphene
Chlorinated diphenyl oxide
Chlorine dioxide
Chlorine trifluoride
Chloroacetaldehyde
α-Chloroacetophenone
Chloroacetyl chloride
o-Chlorobenzylidene malononitrile
Chlorobromomethane
Chlorodifluoromethane
1-Chloro-1-nitropropane
Chloropentafluoroethane
Chloropicrin
o-Chlorostyrene
o-Chlorotoluene
2-Chloro-6-trichloromethyl pyridine
Chlorpyrifos
Chromite ore processing
Chromium(II) compounds
Chromium(III) compounds
Chromium metal
Clopidol
Cobalt metal*
Cobalt carbonyl*
Cobalt hydrocarbonyl*
Copper
Crag® herbicide
Crotonaldehyde*
Crufomate
Cumene
Cyanamide
Cyanogen
Cyanogen chloride
Cyclohexane
Cyclohexanol
Cyclohexene
Cyclohexylamine
Cyclonite
Cyclopentadiene
Cyclopentane
Cyhexatin
2,4-D
Decaborane
Demeton
2,6-Di-tert-butyl-p-cresol
Diazinon
Diazomethane
Diborane
2-N-Dibutylaminoethanol
Dibutyl phosphate
Dibutyl phthalate
Dichloroacetylene
o-Dichlorobenzene
p-Dichlorobenzene
Dichlorodifluoromethane
1,3-Dichloro-5,5-dimethyl hydantoin
1,1-Dichloroethane*
1,2-Dichloroethylene
Dichloroethyl ether
Dichloromonofluoromethane
1,1-Dichloro-1-nitroethane
1,3-Dichloropropene
2,2-Dichloropropionic acid
Dichlorotetrafluoroethane
Dichlorvos
Dicrotophos
Dicyclopentadiene
Dicyclopentadienyl iron
Diethanolamine
Diethyl ketone
Diethyl phthalate
Diethylamine
2-Diethylaminoethanol
Diethylene triamine
Difluorodibromomethane
Diisopropylamine
Dimethyl acetamide
Dimethylamine
Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate
Dimethylformamide
Dimethyl sulfate
Dimethylphthalate
Dimethylaniline
Dinitrolmide
Dinitrobenzene
Dioxathion
Diphenyl
Diphenylamine
Dipropyl ketone
Dipropylene glycol methyl ether
Diquat
Disulfiram
Disulfoton
Diuron
Divinyl benzene
Endosulfan
Endrin
EPN
Ethanolamine
Ethion

Ethyl acetate
Ethyl acrylate
Ethyl alcohol
Ethylamine
Ethyl amyl ketone
Ethyl benzene
Ethyl butyl ketone
Ethyl formate
Ethyl silicate
Ethylene chlorohydrin
Ethylenediamine
Ethylidene norbornene
N-Ethylmorpholine
Fenamiphos
Fensulfothion
Ferbam
Fluorine
Fluorotrichloromethane
Fonofos
Formamide
Formic acid
Gasoline
Germanium tetrahydride
Glutaraldehyde*
Glycidol
Grain dust*
Graphite, natural
Gypsum
Hafnium
Heptachlor
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloronaphthalene
Hexafluoroacetone
sec-Hexyl acetate
Hexylene glycol
Hydrogen bromide
Hydrogen chloride
Hydrogen peroxide
Hydrogen selenide
Hydrogenated terphenyls
2-Hydroxypropyl acrylate
Indene
Indium and compounds
Iodine
Iodoform
Iron oxide, dust and fume
Iron pentacarbonyl
Iron salts, soluble
Isoamyl acetate
Isoamyl alcohol
Isobutyl acetate
Isobutyl alcohol
Isooctyl alcohol
Isopropyl ether
N-Isopropylaniline
Kaolin
Ketene
Limestone
Lindane
Liquified petroleum gas
Lithium hydride
Magnesite
Maleic anhydride
Manganese compounds and fumes
Manganese cyclopentadienyl tricarbonyl
Marble
Mercury (organo) alkyl compounds
Methacrylic acid
Methomyl
Methoxychlor
4-Methoxyphenol
Methyl acetate
Methyl acetylene
Methyl acetylene-propadiene mixture
Methyl acrylate
Methylamine
Methyl 2-cyanoacrylate
Methyl demeton
Methyl ethyl ketone peroxide
Methyl formate
Methyl isobutyl carbinol
Methyl isocyanate
Methyl isopropyl ketone
Methyl methacrylate
Methyl silicate
α-Methyl styrene
Methylacrylonitrile
Methylal
Methylcyclohexane
Methylcyclohexanol
o-Methylcyclohexanone
Methylcyclopentadienyl manganese tricarbonyl
Metribuzin
Monocrotophos
Monomethyl aniline
Morpholine
Naphtha
Naphthalene
Nicotine
p-Nitroaniline
Nitrobenzene
p-Nitrochlorobenzene
Nitroethane

Nitrogen trifluoride
1-Nitropropane
m-Nitrotoluene
o-Nitrotoluene
p-Nitrotoluene
Nonane
Octachloronaphthalene
Oil mist, mineral
Osmium tetroxide
Oxalic acid
Oxygen difluoride
Ozone
Paraffin wax fume
Paraquat
Pentaborane
Pentachloronaphthalene
Pentachlorophenol
Pentaerythritol
Perchloromethyl mercaptan
Perchloryl fluoride
Perlite
Phenothiazine
Phenyl ether, vapor
Phenyl ether-biphenyl mixture, vapor
p-Phenylene diamine
Phenylphosphine
Phorate
Phosdrin
Phosphine
Phosphoric acid
Phosphorus (yellow)
Phosphorus oxychloride
Phosphorus pentachloride
Phosphorus pentasulfide
Phosphorus trichloride
Phthalic anhydride
m-Phthalodinitrile
Picric acid
Pindone
Piperazine dihydrochloride
Plaster of Paris
Platinum
Portland cement
Potassium hydroxide
Propane
Propane sultone
Propargyl alcohol
Propionic acid
Propoxur
n-Propyl acetate
n-Propyl alcohol
n-Propyl nitrate
Propylene dichloride
Propylene glycol dinitrate
Propylene glycol monomethyl ether
Propylene imine
Pyrethrum
Pyridine
Quinone
Resorcinal
Rhodium, soluble and insoluble
Ronnel
Rosin core solder, pyrolysis products
Rotenone
Selenium compounds
Selenium hexafluoride
Silica, amorphous, diatomaceous earth
Silica, amorphous, precipitated and gel
Silicates (<1% crystalline silica)
Silicon
Silicon carbide
Silicon tetrahydride
Silver
Sodium azide
Sodium bisulfite
Sodium fluoroacetate
Sodium metabisulfite
Starch
Stibine
Strychnine
Subtilisins
Sucrose
Sulfur hexafluoride
Sulfur monochloride
Sulfur pentafluoride
Sulfur tetrafluoride
Sulfuryl fluoride
Sulprofos
2,4,5-T
Talc (containing no asbestos)
Tantalum
TEDP
Tellurium
Tellurium hexafluoride
Temephos
TEPP
Terphenyls
1,1,1,2-Tetrachloro-2,2-difluoroethane
1,1,2,2-Tetrachloro-1,2-difluoroethane
Tetrachloronaphthalene
Tetraethyl lead
Tetrahydrofuran
Tetramethyl lead
Tetranitromethane

Tetrasodium pyrophosphate
Tetryl
Thallium
4,4-Thiobis(6-tert,butyl-m-cresol)
Thioglycolic acid
Thionyl chloride
Thiram
Tin, inorganic compounds
Tin oxide
Titanium dioxide
p-Toluidine
Tributyl phosphate
Trichloroacetic acid
1,2,4-Trichlorobenzene
Trichloronaphthalene
1,1,2-Trichloro-1,2,2-trifluoroethane
1,2,3-Trichloropropane
Trifluorobromomethane
Trimethyl benzene
Trimethyl phosphite
Trimethylamine
2,4,6-Trinitrotoluene
Triorthocresyl phosphate
Triphenyl amine
Triphenyl phosphate
Turpentine
Uranium
n-Valeraldehyde*
Vegetable oil mist
Vinyl cyclohexene dioxide
Vinyl toluene
Warfarin
Wood dust
m-Xylene α,α'-diamine
Xylidine
Yttrium
Zinc chloride fume
Zinc stearate
Zirconium compounds

APPENDIX III

CHEMICALS FOR WHICH NIOSH DID NOT ADOPT RELs DURING THE OSHA PEL PROJECT

Appendix III lists chemicals for which NIOSH did not adopt RELs during the OSHA PEL Project. After a limited review of these chemicals, NIOSH concluded that adverse health effects could occur at the proposed OSHA PELs.

Chemicals reviewed by NIOSH

Chemical	Proposed OSHA PEL
Acetylene tetrabromide	1 ppm (15 mg/m^3) TWA
α-Alumina	10 mg/m^3
Benomyl	10 mg/m^3
Chlorobenzene	75 ppm (350 mg/m^3) TWA
Coal dust (<5% SiO_2)	2 mg/m^3 TWA
Coal dust (>5% SiO_2)	0.1 mg/m^3 TWA
Emery	10 mg/m^3
Ethyl bromide	200 ppm (890 mg/m^3) TWA, 250 ppm (1,110 mg/m^3) STEL
Ethyl ether	400 ppm (1,200 mg/m^3) TWA, 500 ppm (1,500 mg/m^3) STEL
Ethylene glycol	50 ppm (125 mg/m^3) ceiling
Fenthion	0.2 mg/m^3 TWA (skin)
Furfural	2.0 (8 mg/m^3) TWA (skin)
Glycerin (mist)	10 mg/m^3
Graphite (synthetic)	10 mg/m^3
2-Isopropoxyethanol	25 ppm (105 mg/m^3) TWA
Isopropyl acetate	250 ppm (950 mg/m^3) TWA, 310 ppm (1,185 mg/m^3) STEL
Isopropylamine	5 ppm (12 mg/m^3) TWA, 10 ppm (24 mg/m^3) STEL
Magnesium oxide fume	10 mg/m^3
Manganese tetroxide (as Mn)	1 mg/m^3 TWA

(Continued)

Chemicals reviewed by NIOSH (Continued)

Chemical	Proposed OSHA PEL
Molybdenum, soluble	5 mg/m^3 TWA
Molybdenum, insoluble	10 mg/m^3
Nitromethane	100 ppm (250 mg/m^3) TWA
Particulates not otherwise regulated	10 mg/m^3
Picloram	10 mg/m^3
Rouge	10 mg/m^3
m-Toluidine	2 ppm (9 mg/m^3) TWA (skin)
Triethylamine	10 ppm (40 mg/m^3) TWA, 15 ppm (60 mg/m^3) STEL
Zirconium tetrachloride	5 mg/m^3 TWA

APPENDIX IV

CHEMICALS FOR WHICH NIOSH REVISED RELs DURING THE OSHA PEL PROJECT

Appendix IV lists chemicals for which NIOSH revised existing RELs during the OSHA PEL Project. These chemicals are listed with their previous and current RELs.

Chemicals with revised RELs

Chemical	Previous REL	Current REL
Acrylamide	0.3 mg/m^3 TWA	Ca; 0.03 mg/m^3 TWA (skin)
Aldrin	Ca; lowest reliably detectable concentration	Ca; 0.25 mg/m^3 TWA (skin)
Allyl chloride	1 ppm (3.1 mg/m^3) TWA 3 ppm (9.3 mg/m^3) ceiling (15-min)	1 ppm (3 mg/m^3) TWA 2 ppm (6 mg/m^3) STEL
Allyl glycidyl ether	9.6 ppm (45 mg/m^3) ceiling (15-min)	5 ppm (22 mg/m^3) TWA (skin), 10 ppm (44 mg/m^3) STEL (skin)
Ammonia	50 ppm (34.8 mg/m^3) ceiling (5-min)	25 ppm (18 mg/m^3) TWA, 35 ppm (27 mg/m^3) STEL
Asphalt fumes	5 mg/m^3 ceiling measured as total particulates	Ca; 5 mg/m^3 ceiling measured as total particulate
Carbon dioxide	10,000 ppm (18,000 mg/m^3) TWA, 30,000 ppm (54,000 mg/m^3) ceiling (10-min)	5,000 ppm (9,000 mg/m^3) TWA, 30,000 ppm (54,000 mg/m^3) STEL
Carbon disulfide	1 ppm (3 mg/m^3) TWA 10 ppm (30 mg/m^3) ceiling (15-min)	1 ppm (3 mg/m^3) TWA (skin) 10 ppm (30 mg/m^3) STEL (skin)

(Continued)

Chemicals with revised RELs (Continued)

Chemical	Previous REL	Current REL
Carbon tetrachloride	Ca; 2 ppm (12.6 mg/m^3) ceiling (60-min)	Ca; 2 ppm (12.6 mg/m^3) STEL (60-min)
Chloroform	2 ppm (9.78 mg/m^3) ceiling (60-min)	Ca; 2 ppm (9.78 mg/m^3) STEL (60-min)
Cyclohexanone	25 ppm (100 mg/m^3) TWA	25 ppm (100 mg/m^3) TWA (skin)
Deildrin	Ca; lowest reliably detectable concentration	Ca; 0.25 mg/m^3 TWA (skin)
Di-2-ethylhexylphthalate	Ca; lowest feasible concentration	Ca; 5 mg/m^3 TWA 10 mg/m^3 STEL
Dicyclohexylmethane, 4'-diisocyanate	0.055 mg/m^3 TWA, 0.21 mg/m^3 ceiling (10-min)	0.01 ppm (0.11 mg/m^3) ceiling
Diglycidyl ether (DGE)	Ca; 0.2 ppm (1 mg/m^3) ceiling (15-min)	Ca; 0.1 ppm (0.5 mg/m^3) TWA
Dinitro-o-cresol	0.2 mg/m^3 TWA	0.2 mg/m^3 TWA (skin)
Dinitrotoluene	Ca; lowest feasible concentration	Ca; 1.5 mg/m^3 TWA (skin)
Ethylene dichloride	Ca; 1 ppm (4 mg/m^3) TWA, 2 ppm (8 mg/m^3) ceiling (15-min)	Ca; 1 ppm (4 mg/m^3) TWA, 2 ppm (8 mg/m^3) STEL
Ethylene glycol dinitrate	0.1 mg/m^3 ceiling (20-min)	0.1 mg/m^3 STEL (skin)
Ferrovanadium dust	1 mg/m^3 TWA	1 mg/m^3 TWA, 3 mg/m^3 STEL
Furfuryl alcohol	50 ppm (200 mg/m^3) TWA	10 ppm (40 mg/m^3) TWA (skin), 15 ppm (60 mg/m^3) STEL (skin)
Hexachloroethane	Ca; lowest feasible concentration	Ca; 1 ppm (10 mg/m^3) 8-hr TWA
Hexane	100 ppm (350 mg/m^3) TWA	50 ppm (180 mg/m^3) TWA

(Continued)

Chemicals with revised RELs (Continued)

Chemical	Previous REL	Current REL
Hydrogen cyanide	4.7 ppm (5 mg/m^3) ceiling (10-min)	4.7 ppm (5 mg/m^3) STEL (skin)
Hydrogen fluoride	3 ppm (2.5 mg/m^3) TWA, 6 ppm (5 mg/m^3) ceiling (15-min)	3 ppm (2.5 mg/m^3) TWA, 6 ppm (5 mg/m^3) STEL
Isophorone diisocyanate	0.005 ppm (0.045 mg/m^3) TWA, 0.020 ppm (0.180 mg/m^3) ceiling (10-min)	0.005 ppm (0.045 mg/m^3) TWA (skin) 0.02 ppm (0.180 mg/m^3) STEL (skin)
Isopropyl alcohol	400 ppm (984 mg/m^3) TWA, 800 ppm (1,968 mg/m^3) ceiling (15-min)	400 ppm (980 mg/m^3) TWA, 500 ppm (1,225 mg/m^3) STEL
Malathion	15 mg/m^3 TWA	10 mg/m^3 TWA (skin)
Mercury, aryl and inorganic	0.05 mg/m^3 TWA	0.1 mg/m^3 ceiling (skin)
Mercury vapor	0.05 mg/m^3 TWA	0.05 mg/m^3 TWA (skin)
Methyl alcohol	200 ppm (262 mg/m^3) TWA, 800 ppm (1,048 mg/m^3) ceiling (15-min)	200 ppm (260 mg/m^3) TWA (skin), 250 ppm (325 mg/m^3) STEL (skin)
Methyl ethyl ketone (MEK)	200 ppm (590 mg/m^3) TWA	200 ppm (590 mg/m^3) TWA, 300 ppm (885 mg/m^3) STEL
Methyl iodide	Ca; lowest feasible concentration	Ca; 2 ppm (10 mg/m^3) TWA (skin)
Methyl isobutyl ketone	50 ppm (205 mg/m^3) TWA	50 ppm (205 mg/m^3) TWA, 75 ppm (300 mg/m^3) STEL
Methyl parathion	0.2 mg/m^3 TWA	0.2 mg/m^3 TWA (skin)
4,4'-Methylene bis (2-chloroaniline) (MBOCA)	Ca; 0.003 mg/m^3 TWA	Ca; 0.003 mg/m^3 TWA (skin)
Nitric acid	2 ppm (5 mg/m^3) TWA	2 ppm (5 mg/m^3) TWA, 4 ppm (10 mg/m^3) STEL

(Continued)

Chemicals with revised RELs (Continued)

Chemical	Previous REL	Current REL
Nitrogen dioxide	1 ppm (1.8 mg/m^3) ceiling (15-min)	1 ppm (1.8 mg/m^3) STEL
Nitroglycerin	0.1 mg/m^3 ceiling (20-min)	0.1 mg/m^3 STEL (skin)
Parathion	0.05 mg/m^3 TWA	0.05 mg/m^3 TWA (skin)
Phenol	5 ppm (19 mg/m^3) TWA, 15.6 ppm (60 mg/m^3) ceiling (15-min)	5 ppm (19 mg/m^3) TWA (skin), 15.6 ppm (60 mg/m^3) ceiling (skin)
Phenylhydrazine	Ca; 0.14 ppm (0.6 mg/m^3) ceiling (120-min)	Ca; 0.14 ppm (0.6 mg/m^3) ceiling (120-min) (skin)
Styrene	50 ppm (215 mg/m^3) TWA, 100 ppm (425 mg/m^3) ceiling (15-min)	50 ppm (215 mg/m^3) TWA, 100 ppm (425 mg/m^3) STEL
Sulfur dioxide	0.5 ppm (1.3 mg/m^3) TWA	2 ppm (5 mg/m^3) TWA, 5 ppm (10 mg/m^3) STEL
1,1,2,2-Tetrachloroethane	Ca; lowest feasible concentration	Ca; 1 ppm (7 mg/m^3) TWA (skin)
Tetramethyl succinonitrile	1 ppm (6 mg/m^3) ceiling (15-min)	0.5 ppm (3 mg/m^3) TWA (skin)
Tin, organic compounds	0.1 mg/m^3 TWA	0.1 mg/m^3 TWA (skin)
Toluene	100 ppm (375 mg/m^3) TWA, 200 ppm (750 mg/m^3) ceiling (10-min)	100 ppm (375 mg/m^3) TWA, 150 ppm (560 mg/m^3) STEL
1,1,2-Trichloroethane	Ca; minimize exposure	Ca; 10 ppm (45 mg/m^3) TWA (skin)
Trimellitic anhydride	Should be handled in the workplace as an extremely toxic substance	0.005 ppm (0.04 mg/m^3) TWA; should be handled in the workplace as an extremely toxic substance
Tungsten:		
Insoluble	5 mg/m^3 TWA	5 mg/m^3 TWA, 10 mg/m^3 STEL
Soluble	1 mg/m^3 TWA	1 mg/m^3 TWA, 3 mg/m^3 STEL

(Continued)

Chemicals with revised RELs (Continued)

Chemical	Previous REL	Current REL
Xylene	100 ppm (434 mg/m^3) TWA, 200 ppm (868 mg/m^3) ceiling (10-min)	100 ppm (435 mg/m^3) TWA, 150 ppm (655 mg/m^3) STEL
Zinc oxide, fume	5 mg/m^3 TWA, 15 mg/m^3 ceiling (15-min)	5 mg/m^3 TWA, 10 mg/m^3 STEL

APPENDIX V

CATEGORIES OF PESTICIDES

NIOSH recommends three categories to define the toxicity of pesticides for the various routes of exposure (oral, inhalation, and dermal). Group I contains the pesticides that pose a significant risk of (1) adverse acute health effects at low concentrations, or (2) carcinogenic, teratogenic, neurotoxic, or reproductive effects. Group II pesticides pose adverse acute health risks at moderate doses, and Group III pesticides pose minimal risk of adverse acute effects even at relatively high doses. For further discussion and clarification, refer to the 1978 NIOSH criteria document on pesticides (Criteria for a recommended standard: occupational exposure during the manufacturing and formulation of pesticides, DHEW (NIOSH) Publication No. 78-174, NTIS No. PB-81-227-001). Many of the chemicals listed as pesticides have other applications and are presented in Sections A and B.

GROUP I PESTICIDES

Acephate-met
3-(alpha-Acetonylfurfuryl)-4-hydroxycoumarin
3-(alpha-Acetonylfurfuryl)-4-hydroxycoumarin, sodium salt of
Acrolein
Acrylonitrile (C)*
Alachlor
Aldicarb
Aldrin (C) (T) (N)
Alkyl amine acetate (48% C12, 18% C14, 10% C18, 9% C16, 8% C8, 7% C10) (as in fatty acids of coconut oil)
Alkyl amine hydrochloride (as in fatty acids of coconut oil)
Alkyl amine tetrachlorophenate (as in fatty acids of coconut oil)
1-(Alkyl amino)-3-aminopropane acetate (as in fatty acids of coconut oil)
1-(Alkyl amino)-3-aminopropane hydroxyacetate (as in fatty acids of coconut oil)
1-(Alkyl amino)-3-aminopropane propionate - copper acetate complex (as in fatty acids of coconut oil)
Alkyl amino betaine (46% C12, 24% C14, 10% C16, 8% C10, 7% C8, 5% C18)
2-Alkyl-1-(2-aminoethyl)-2-imidazoline acetate
Alkyl ammonium salts
Alkyl bis(2-hydroxyethyl) amine acetate (65% C18, 30% C16, 5% C14)
N'-Alkyl-N-(2-cyanoethyl)1,3-diaminpropane (as in fatty acids of coconut oil)
Alkyl diamine monobenzoate (as in fatty acids of coconut oil)
Alkyl diethanolamide (70% C12, 30% C14)
N-Alkyl dihydroxyethyl amine oxide (50% C12, 22% C14, 10% C15, 8% C10, 5% C18)

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*Abbreviations: (C) = suspected carcinogen; (N) = suspected neurotoxin; (R) = suspected reproductive effect; (T) = suspected teratogen.

N-Alkyl Dipropoxy tert-amine (47% C12, 18% C14, 10% C18, 9% C10, 8% C16, 8% C8)
Alkyl (ethylcyclomimidinium) 3-hydroxy-3-ethyl sodium alcoholate, 2-methyl sodium carboxylate-tridecyl polyoxyethylene ethanol-iodine complex (100% C12)
2-Alkyl 1-(2-hydroxyethyl)-1 or 3-benzyl-2-imidazolium chloride (C18 as in fatty acids of tall oil)
2-Alkyl 1-(2-hydroxyethyl)-2-imidazoline acetate (as in fatty acids of tall oil)
2-Alkyl 1-(2-hydroxyethyl)-2-imidazoline (C18 as in fatty acids of tall oil)
2-Alkyl 1-hydroxyethyl imidazoline phosphate (100% C13)
Alkyl monoethanol amide (as in fatty acids of coconut oil)
Allyl alcohol
Aluminum phosphide
4-Aminopyridine
Amiton
Amitrole (C)
Ammonium arsenite (C)
Ammonium fluosilicate
Ammonium sulfamate
Anilinocadmium dilactate
ANTU (α-Naphthylthiourea)
Aromatic petroleum derivative solvent
Aromatic petroleum distillate, oil, solvent or hydrocarbons
Arsenic acid (C)
Arsenic pentoxide (C)
Arsenic sulfide (C)
Arsenic trioxide (C)
Auramine
Azinphos
Azinphos-methyl
Benzadox, ammonium salt of
1,2-Benzisothiazolin-3-one
Benzoic acid
Benzyl bromoacetate
o-Benzyl-p-chlorophenol
o-Benzyl-p-chlorophenol, potassium salt of
o-Benzyl-p-chlorophenol, sodium salt of
Benzyl diethyl ((2,6-xylylcarbamoyl)methyl)ammonium benzoate
Benzyl(dodecylcarbamoylmethyl)dimethylammonium chloride
Bifenox
1,4-Bis(bromoacetoxy)-2-butene
Bis(2-chloroethyl)ether (C)
trans-1,2-Bis(propysulfonyl) ethene
Bis(tributyltin) adipate
Bis(tributyltin) dodecenyl succinate
Bis(tributyltin) oxide
Bis(tributyltin) succinate
Bis(tributyltin) sulfide
Bis(tributyltin) sulfosalicylate
Bis(trichcloromethyl) sulfone
Boric acid
Bromacil
Bromacil, lithium salt of
Bromacil, sodium salt of
4-Bromoacetoxymethyl-m-dioxolane

1-Bromo-3-chloro-5,5-dimethylhydantoin
beta-Bromo-beta-nitrostyrene
Bromophos
1,1'-(2'Butenylene) bis(3,5,7-triaza-1-azoniaadamantane chloride)
tert-Butyl hydroperoxide
Butyric anhydride
Cadmium chloride
Calcium arsenate (C)
Calcium arsenite (C)
Calcium cyanide
Calcium cyanamide
Calcium ethylenebisdithiocarbamate (C)
Calcium hypochlorite
Calcium polysulfide
Captafol (T)
Captan (T)
Carbofuran
Carbon disulfide
Carbon tetrachloride (C)
Carbophenothion (N)
Carboxin
5-and 6-Carboxy-4-hexyl-2-cyclohexane-1-octanoic acid-iodine complex, polyoxyethylene ethanol esters of
Carboxymethyl-1,1-ethylcarboxymethyl-2-undecylimidazolinium hydroxide, disodium salt of
Cetyl dimethyl ethyl ammonium bromide
Cetyl puridinium bromide
Cetyl pyridinium chloride
Cetyl trimethyl ammonium bromide
Cetyl trimethyl ammonium chloride
Chloramben, and esters and salts (C)
Chlordane (C)
Chlordecone (C) (N) (R)
Chlorfenvinfos
Chlorinated levulinic acid
Chlorine
Chlorine dioxide
Chlorobenzilate
4-Chloro-2-cyclopentylphenol
4-Chloro-2-cyclopentylphenol, potassium salt of
4-Chloro-2-cyclopentylphenol, sodium salt of
5-Chloro-2-(2,4-dichlorophenoxy)phenol
0-(2-Chloro-2-(2,5-dichlorophenyl)vinyl) 0,0-diethyl phosphorothioate
Chloroethylene bisthiocyanate
Chloroform (C)
Chloromethoxypropylmercuric acetate
1-Chloro-2-nitropropane
4-Chloro-2-phenylphenol
6-Chloro-2-phenylphenol
6-Chloro-2-phenylphenol, potassium salt of
6-Chloro-2-phenylphenol, sodium salt of
2-((p-Chlorophenyl)phenylacetyl)-1,3-indandione
Chloropicrin
4-Chloropyridine n-oxide

Chlorothalonil
4-Chloro-3,5-xylenol
Chlorpyrifos
Chromic acid
Coal tar (C)
Coal tar acids, coal tar phenols, cresylic acid or cresols
Coal tar neutral oils or coal tar hydrocarbons
Coal tar phenols of coal tar acids
Copper acetoarsenite
Copper arsenate (C)
Copper arsenite (C)
Copper (metallic)
Copper naphthenate
Copper oxide
Copper sulfate
Copper sulfate, basic
Copper-zinc-chromate complex (C)
Coumaphos
Creosote (wood) (C)
Creosote (coal tar), coal tar creosote or coal tar creosote oils (C)
Creosote oil or coal tar creosote oils (C)
Cresol
Cresylic acid
Crotoxyphos
Cryolite
Cupric oxide
Cyanuric acid
Cycloheximide
Cyhexatin
DDD (C)
DDT (C)
Demetron
Dialifor
Dialkyl ammonium salts
Diamidfos
Diammonium ethylene bisdithiocarbamate (C)
Diazinon
1,2-Dibromo-3-chloropropane (C)(R)
2,2-Dibromo-3-nitrilopropionamide
Dichlone
1,2-Dichloropropane, 1,2-dichloropropene and other related compounds
1,3-Dichloropropene
Dichloro-S-triazinetrione
Dichloro-S-triazinetrione, potassium salt
Dichloro-S-triazinetrione, sodium salt of
Dichlorvos
Dicrotophos
Didecylmethyl benzyl ammonium chloride
Dieldrin (C)(T)(N)
0,0-Diethyl 0-(2-(diethylamino)-6-methyl-4-pyrimidinyl) phosphorothioate
N3,N3-Diethyl-2,4-dinitro-6-(trifluoromethyl)-m-phenylenediamine
Diethyl diphenyl dichloroethane and related compounds

N,N-Diethyl-m-toluamide, and other isomers
Difenzoquat methyl sulfate
Diisobutylcresoxyethoxyethyl dimethyl benzyl ammonium chloride
Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride
Dimethyl 3-hydroxyglutaconate dimethyl phosphate
4,6-Dinitro-o-cresol
4,6-Dinitro-o-cresol, sodium salt of
2,4-Dinitrophenol
Dinoseb, and esters and salts
Dioxathion
Diphacinone, and esters and salts
Diphenamid
Diphenylamine
Di(phenylmercury)ammonium propionate
Di(phenylmercury)dodecenylsuccinate
Diphenylstibene 2-ethylhexanoate
Diquat dibromide
Disodium acid methanearsonate
Disulfoton
DMPA (N)
Dodecylamine lactate
Dodecylamine salicylate
Dodecylammonium methanearsonate
Dodecylammonium sulfate
Dodecylbenzene sulfonic acid
Dodecylbenzene sulfonic acid, diethanolamine salt of
Dodecylbenzene sulfonic acid, monoethanolamine salt of
Dodecylbenzyl octadecyl dimethyl ammonium chloride
Dodecylbenzyl trimethyl ammonium chloride
Dodecylbenzyl trimethyl ammonium 2-ethylhexoate
Dodecyldimethyl benzyl ammonium chloride
Dodecyldimethyl benzyl ammonium naphthenate
Dodecyldimethyl benzyl ammonium bromide
N-Dodecyldimethyl trichlorobenzyl ammonium chloride
Dodecyldimethyl 2,4,5-trimethyl benzyl ammonium chloride
Dodecylguanidine hydrochloride
Dodecylguanidine terephthalate
Dodine and hydrochloride
Endosulfan
Endothall, and esters and salts
Endrin (T)
EPN (N)
Ethephon
Ethion
Ethoprop
Ethylene
Ethylene dichloride
Ethylene dibromide (C)
Ethylene oxide
Ethyl formate
Ethylmercury phosphate
Ethyl 4-(methylthio)-m-tolyl isopropylphosphoramidate

4,4'-(2-Ethyl-2-nitrotrimethylene) dimorpholine
Fenbutatin oxide
Fensulfothion
Ferrous sulfate heptahydrate
Fluoroacetamide
Fluorodifen
Fluosilicic acid
Folpet (T)
Fonofos
Formaldehyde
Formetanate hydrochloride
Glutaraldehyde
Glycolic acid
Glycolic acid, potassium salt of
Haloxon (N)
Heptachlor (C)
2-Heptadecyl-1-methyl-1-(2-(stearoylamido)ethyl) imidazolinium methyl sulfate
1-Heptadecenyl-2-(2-hydroxyethyl) imidazolinium chloride
2-Heptadecenyl imidazoline
2-Heptadecenyl imidazolinium chloride
2-Heptadecenyl-2-imidazoline acetate
Heptadecyl hydroxyethyl imidazoline
Heptadecyl hydroxyethyl imidazolinum chloride
Heptadecyl hydroxyethyl imidazolinum hydrochloride
Hexahydro-1,3,5-tris(2-hydroxyethyl)-S-triazine
Hexahydro-1,3,5-tris(2-hydroxypropyl)-S-triazine
Hexakis (2-methyl-2-phenylpropyl)distannoxane
Hydroiodic acid
Hydrocyanic acid
Hydrofluoric acid
Hydrogen chloride
2-((Hydroxymethyl)amino)-2-methylpropanol
S-(2-Hydroxypropyl) thiomethanesulfonate
Indole-3-butyric acid
Iodine
3-Iodo-2-propynyl butylcarbamate
Isobutyric acid
2,Isovaleryl-1,3-indandione
2-Isovaleryl-1,3-indandione, calcium salt of
2-Isovaleryl-1,3-indandione, sodium salt of
Lead acetate
Lead arsenate, basic (C)
Lead arsenate, standard (C)
Leptophos (N)
Lindane
Lithium hypochlorite
Maneb (C)
Mercuric chloride
Mercuric oxide
Mercurous chloride
Mercury (metallic)
Metaldehyde

Methidathion
Methomyl
Methyl bromide
Methyldodecylbenzyl trimethyl ammonium chloride 80% and methyldodecylxylylene bis(trimethyl ammonium chloride) 20%
2,2'-Methylene bis(4-chlorophenol)
2,2'-Methylene bis(4-chlorophenol), sodium salt of
2,2'-Methylene bis(4,6-dichlorophenol), sodium salt of
Methylene bis(thiocyanate)
2,2'-Methylene bis(3,4,6-trichlorophenol)
2,2'-Methylene bis(3,4,6-trichlorophenol), disodium salt of
2,2'-Methylene bis(3,4,6-trichlorophenol), monosodium salt of
Methylmercury quinolinolate
Methyl parathion
Metolachlor
Mevinphos
Mexacarbate
Mirex (C)
Monocrotophos
Nabam (C)
Naled
Nicotine or nicotine alkaloid
Nicotine sulfate
4-(2-Nitrobutyl)morpholine
2-Nitro-1-butyl phosphate
Nitrofen (C)
2-Nitropropane (C)
Nonylphenoxypolyethoxyethanol-iodine complex
Octyl decyl dimethyl ammonium chloride
Octyl dodecyl dimethyl ammonium chloride
2-N-Octyl-4-isothiazolin-3-one
Oil of citronella
Oxalic acid
Oxamyl
Paraformaldehyde
Paraquat bis(methylsulfate)
Paraquat dichloride
Parathion
Parinol
PCNB
Pentachlorophenol
Pentachlorophenol, fatty acid esters of (100 % C6-C20)
Pentachlorophenol, potassium salt of
Pentachlorophenol, zinc salt of alkyl-N-propanediamine (C16-C18)
n-Pentyl valerate
Perfluidone
Petroleum distillate, oils, solvent, or hydrocarbons; also paraffinic hydrocarbons, aliphatic hydrocarbons, paraffin oil
Phenol
Phenylmercuric acetate
Phenylmercuric ammonium acetate
Phenylmercuric ammonium propoionate

Phenylmercuric borate
Phenylmercuric carbonate
Phenylmercuric 2-ethylhexanoate
Phenylmercuric formamide
Phenylmercuric lactate
Phenylmercuric oleate
Phenylmercuric propionate
Phenylmercuric triethanol ammonium lactate
o-Phenylphenol
o-Phenylphenol, alkenyl amine salt of (100% C8-C18)
o-Phenylphenol, alkyl amine-copper salt of (100% C8-C18)
o-Phenyphenol, alkyl amino-zinc salt of (100% C18)
o-Phenyphenol, ammonium salt of
o-Phenylphenol, potassium salt of
o-Phenylphenol, tetradecylamine salt of
Phorate
Phosazetim
Phosmet (T)
Phosphamidon
Phosphoric acid
Phosphorus
Pindone and salts
Polyethoxypolypropoxyethanol-iodine complex
Poly(oxyethylene(dimethylimino)ethylene (dimethyliminio)ethylene dichloride
Polyram (C)
Potassium ammonium ethylene bisdithiocarbamate (C)
Potassium chromate
Potassium cyanate
Potassium dichromate
Potassium N-hydroxymethyl-N-methyldithiocarbamate
Potassium mercuric iodide
Potassium permanganate
Profluralin
Propargite
Propionic acid
Propylene oxide
Pyridylmercuric acetate
N1-(2-Quinoxalinyl)sulfanilamide
Red squill
Silver fluoride
Sodium aluminum fluosilicate
Sodium arsenate (C)
Sodium arsenite (C)
Sodium azide
Sodium bisulfite
Sodium bisulfate
Sodium chlorite
Sodium chromate
Sodium cyanide
Sodium dichromate
Sodium fluoride
Sodium fluoroacetate

Sodium fluosilicate
Sodium hydroxide
Sodium hypochlorite
Sodium pentachlorophenate
Sodium phosphate
Sodium pyroarsenate (C)
Stoddard solvent
Strychnine
Strychnine sulfate
Sulfamic acid
Sulfur
Sulfur dioxide
Sulfuric acid
Sulfuryl fluoride
Tartar emetic
TEDP
TEPP
Terbufos
Terpene polychlorinates
2,4,5-T, and esters and salts (T)
1,1,2,2-Tetrachloroethane (C)
Tetrachloroethylene (C)
2,3,5,6-Tetrachloro-4-(methylsulfonyl)pyridine
Tetrachlorophenols
Tetrachlorophenols, alkyl amine salt (as in fatty acids of coconut oil)
Tetrachlorophenols, potassium salt of
Tetrachlorvinphos (C)
3,3,4,4-Tetrachlorotetrahydrothiophene-1,1-dioxide (92%) and other chlorintate thiophene dioxide (8%)
Tetradecylbenzene sulfonate-hypochlorous acid complex
Tetradifon
Tetrahydro-3,4-dimethyl-2H-1,3,5-thiadiazine-2-thione
2-(4-Thiazolyl)benzimidazole
2-(Thiocyanomethylthio)benzothiazole
Thiram (T)
Toxaphene
S,S,S-Tributyl phosphorotrithioate (N)
S,S,S-Tributyl phosphorotrithioite (N)
Tributyltin fluoride
Tributyltin monopropylen glycol maleate
Tributyltin neodecanoate
Trichloroacetic acid
Trichloroacetic acid, sodium salt
Trichloroethylene (C)
2,4,5-Trichlorophenol
2,4,5-Trichlorophenol, sodium salt of
2,3,5-Trichloro-4-propylsulfonyl pyridine 36% other chlorinated pyridines mono(trichloro)tetra (monpotassiumdichloro)penta-s- triazinetrione 4% inert 60%
Trichloro-S-triazinetrione
α, α, α Trifluoro-4-nitro-m-cresol
Trifluralin (C)
Triforine
3-(Trimethoxysilyl)propyl dimethyl octadecylammonium chloride

Triphenyltin fluoride
Triphenyltin hydroxide
Trisodium phosphate
Vinylene bis(thiocyanate)
Warfarin
Warfarin, sodium salt of
Xylene
Zinc ion and manganese ethylen bisdithiocarbamate 80%, a coordination product of manganese 16%, zinc 2%, ethylene bisdithiocarbamate 62% (C)
Zinc mercury chromate (C)
Zinc phosphide
Zinc 2-pyridinethiol 1-oxide
Zineb (C)
Ziram

GROUP II PESTICIDES

alpha-Alkyl-omega-hydroxypoly(oxyethylene)(100% C12-C15)
Alkyl poly(oxypropylene) poly(oxyethylene)-iodine complex (100% C12-C15)
Alkyl 1,3-propanediamine (53% C12, 19% C14, 8.5% C16, 7% C8, 6.5% C10, 6% C18)
Alkyl 1,3-propylenediamine (as in fatty acids of coconut oil)
Alkyl 1,3-propylenediamine (42% C12, 26% C18, 15% C14, 8% C16, 5% C10, 4% C8)
Alkyl 1,3-propylenediamine (47% C12, 18% C14, 10% C18, 9% C10, 8% C16, 8% C8)
N-Alkyl 1,3-propylenediamine acetate (as in coconut oil fatty acids)
Alkyl 1,3-propylenediamine acetate (47% C12, 18% C14, 10% C18, 9% C10), 8% C16, 8% C8)
N-Alkyl 1,3-propylenediamine adipate (as in fatty acids of coconut oil)
Alkyl 1,3-propylenediamine monobenzoate (as in fatty acids of coconut oil)
Allethrin
Ametryn
Amitraz
Ammonium polysulfides
Antimycin A
B. lentimorbus
B. popilliae
B. thuringiensis
BAN
Barium carbonate
Barium metaborate
Bentazon, sodium salt of
Benzaldehyde
4-Benzothienyl methylcarbamate
Benzyl alcohol
Benzyl benzoate
(5-Benzyl-3-furyl)methyl 2,2-dimethyl-3-(2-methylpropenyl) cyclopropane-carboxylate
2,3,4,5-Bis(2-butylene)tetrahydro-2-furaldehyde
1,1-Bis(chlorophenyl)-2,2,2-trichloroethanol
Bis(tripropyltin) oxide
Bone oil
2-Bromo-4'-hydroxyacetophenone
Bromoxynil octanoate
Bufencarb
2-Butanol
2-Butoxyethanol
Butoxypolypropoxypolyethoxyethanol-iodine complex
Butralin
tert-Butyl alcohol
sec-Butylamine
tert-Butyl dimethyltrithioperoxycarbamate
Cacodylic acid
Cacódylic acid, sodium salt of
Cadmium-calcium-copper-zinc-sulfate-chromate complex
Cadmium carbonate
Cadmium sebacate
Cadmium succinate
Cadmium sulfate
Calcium propanearsonate

Calcium propionate
Carbaryl
Cetyl alcohol
n-Cetyl-n-ethyl morpholinium ethylsulfate
Chloranil
Chlordimeform
Chlordimeform hydrochloride
2-Chloroallyl diethyldithiocarbamate
1-(3-Chloroallyl)-3,5-6-triaza-1-azoniaadamantane chloride
S-(4-Chlorobenzyl) diethylthiocarbamate
4-Chloro-m-cresol
2-((4-Chloro-6-(ethylamino)-S-triazine-2-yl)amino)-2-methyl-propionitrile
2-Chloroethyl trimethyl ammonium chloride
2-Chloro-n-isopropylacetanilide
5-Chloro-2-mercaptobenzothiazole, lauryl pyridinium salt of
o-Chlorophenol
o-Chlorophenol, sodium salt of
p-Chlorophenoxyacetic acid, diethanolamine salt of
2-(m-Chlorophenoxy)propionamide
2-(m-Chlorophenoxy)propionic acid
2-(m-Chlorophenoxy)propionic acid, sodium salt of
p-Chlorophenyl diiodomethyl sulfone
2-Chloro-4-phenylphenol
2-Chloro-4-phenylphenol, potassium salt of
2-Chloro-4-phenylphenol, sodium salt of
4-Chloro-2-phenylphenol, potassium salt of
4-Chloro-2-phenylphenol, sodium salt of
4 and 6-Chloro-2-phenylphenol, diethanolamine salt of
3-Chloro-p-toluidine hydrochloride
d-trans-Chrysanthemum monocarboxylic acid ester of d-2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one
Copper carbonate
Copper oleate
Copper 8-quinolinolate
Copper salts of fatty and rosin acids
Crufomate
Cube resins
3-Cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione
Cythioate
2,4-D
2,4-D, alkanolamine salts of ethanol and isopropyl series of
2,4-D, butyl ester of
2,4-D, dimethylamine salt of
2,4-D, isooctyl (2-ethylhexyl) ester of
2,4-D, isooctyl (2-octyl) ester of
2,4-D, isopropyl ester of
2,4-D, lithium salt of
2,4-D, n-oleyl-1,2-propylenediamine salt of
2,4-D, potassium salt of
2,4-D, triethanolamine salt of
2,4-DB
2,4-DB, dimethylamine salt of
1-Decanol

Demeton-S-methyl
Desmedipham
N,N-Diallyl-2-chloroacetamide
Dicapthon
Dichlobenil
Dichlofenthion
o-Dichlorobenzene
p-Dichlorobenzene
2,4-Dichloro-6-(o-chloroanilino)-5-triazine
1,3-Dichloro-5,5-dimethylhydantoin
2,6-Dichloro-4-nitroaniline
4,6-Dichloro-2-phenylphenol
4,6-Dichloro-2-phenyphenol, potassium salt of
3',4'-Dichloropropionanilide
Dichlorprop, and esters and salts
Diethylene dithiobis (thionoformate)
Diethylene glycol monomethyl ether
1,2-Dihydro 3,6-pyridazinedione
1,2-Dihydro-3,6-pyridazinedione, diethanolamine salt of
1,2-Dihydro-3,6-pyridazinedione, potassium salt of
Diiodomethyl p-tolyl sulfone
Diisobutyl ketone
Dimethoate
p-(Dimethylamine) benzenediazo sodium sulfonate
2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate
Dimethyl tetrachloroterephthalate
Dimethyl(2,2,2-trichloro-1-hydroxyethyl)phosphonate ester of butyric acid
2,4-Dinitrochlorobenzene
Diphenylacetonitrile
Disodium 2,2'-thiobis(4,6-dichlorophenate)
Diuron
Epichlorohydrin
Erbon
Ethanol
6-Ethoxy-1,2-dihydro-2,2,4-trimethyl quinoline
5-Ethoxy-3-(trichloromethyl)-1,2-4-thiadiazole
S-Ethyl dipropylthiocarbamate
Ethylenediamine
S-Ethyl hexahydro-1H-azepine-1-carbothioate
Eugenol
Famphur
Fatty alcohols (54.5% C10, 45.1% C8, 0.4% C6)
Fatty alcohols (56% C10, 42% C8, 1.5% C12, 0.5% C6)
Fatty alcohols (55.10% C10, 42.88% C8, 1.01% C6, 1.01% C12)
Fenitrothion
Fenthion
Fluchloralin
Glyphosate, isopropylamine salt of
Hexachlorobenzene
Hexachlorocyclohexane, technical
Hexachlorocyclopentadiene
Hexachloroethane

2-((Hydroxymethyl)amino)ethanol
2-(Hydroxymethyl)-2-nitro-1,3-propanediol
3-Hydroxy-N,N,5-trimethylpyrazole-1-carboxamide dimethylcarbamate
Isobornyl acetate
Isobornyl thiocyanoacetate
Isobutanol
Isopropanol
o-Isopropoxyphenyl methylcarbamate
Isopropyl N-(3-chlorophenyl)carbamate
Isopropyl N-phenylcarbamate
Karbutilate
Malathion
MCPA, and esters and salts
MCPB, and esters and salts
Menthol
2-Mercaptobenzothiazole, and esters and salts
Methanol
Methazole
Methiocarb
Methylated aromatic petroleum derivative
Methylated naphthalenes
Methylcarbophenothion
2,2'-Methylene bis(4,6-dichlorophenol)
Methylene chloride
Methyl esters of fatty acids (C8 - C12)
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl isothiocyanate
Methyl nonyl ketone
4-(Methylthio)-3,5-xylyl methylcarbamate
Mineral oil, mineral seal oil, white mineral oil
Monuron
Monuron trichloroacetate
1-Naphthaleneacetic acid, and esters and salts
(2-Naphthyloxy) acetic acid
N-1-Naphthylphthalamic acid, and esters and salts
Neodecanoic acid
Nitrapyrin
N-9-Octadecenyl-1,3-propanediamine monogluconate
1-Octanol
Oleic acid
Ovex
10,10'-Oxybisphenarsazine
10,10'-Oxybisphenoxarsine
Peroxyacetic acid
Phenmedipham
Phenothiazine
Phenthoate
2-Phenylethanol
2-Phenylethyl propionate
Phosalone
Pine oil

Pine tar
Pine tar oil
Piperonyl butoxide
Polybutene
Potassium gibberellate
Prometon
Pyrethrins
Pyrethrum powder other than pyrethrins
N-3-Pyridylmethyl-N'-p-nitrophenylurea
Ronnel
Rotenone
Sabadilla alkaldids
Silicon dioxide
Silvex, and esters and salts
Simazine
Sodium N,N-dimethyl dithiocarbamate
Sodium methyldithiocarbamate
Sodium propionate
Sodium 2-pyridinethio 1-oxide
Streptomycin
Streptomycin sulfate
Sulfoxide
Temephos
1,2,4,5-Tetrachloro-3-nitrobenzene
Tetraglycine hydroperiodide
Tetraiodoethylene
0,0,0,0-Tetrapropyl dithiopyrophosphate
Thiobencarb
3,4'-5-Tribromosalicylanilide
Tributyltin acetate
Tributyltin benzoate
Tributyltin chloride
Tributyltin chloride complex of ethylene oxide condensate of abietylamine
Tributyltin resinate
Trichlorfon
2,3,6-Trichlorobenzoic acid and related polycholorbenzoid acids, dimethlamine salt of
Triethylene glycol
Trimethylbenzyl ammonium resin, polybromide form
3,4,5 and 2,3,5-Trimethylphenyl methylcarbamate
Xylene range aromatic solvent
Zinc fluosilicate
Zinc naphthenate
Zinc sulfate
Zinc sulfate, basic

GROUP III PESTICIDES*

Acephate
Acetic acid
Acetone
Acrylic polymer resins
Allantoin
Allyl isothiocyanate
Aluminum chloride
Aluminum chlorohydroxy allantoinate
Aluminum hydroxybenzenesulfonate
Aluminum sulfate
Amidithion
4-Amino-6-tert-butyl-3-(methylthio)-as-triazine-5(4H)-one
Ammonia
Ammonium alum
Ammonium carbonate
Ammonium citrate
Ammonium hydroxide
Ammonium hydroxide - C8 fatty acid silver complex
Ammonium isobutyrate
Ammonium lauryl sulfate
Ammonium oleate
Ammonium oxalate
Ammonium sulfate
Ammonium thiosulfate
Amyl acetate
o-sec-Amylphenol
p-tert-Amylphenol
p-tert-Amylphenol, potassium salt of
p-tert-Amylphenol, sodium salt of
Anabasine
Ancymidol
Anthracene oil
Asphalt
Asulam, sodium salt of
Atrazine
Benomyl
Bensulide
d-trans(5-Benzl-3-furyl) methyl 2,2-dimethyl-3-(2-methylpropeny) cyclopropane carboxylate
Binapacryl
Biphenyl
2,2-Bis(4-chlorophenyl)ethanol

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*Approximately 350 compounds in Group III were placed there by default (i.e., there were no data on which to base their classification in another group). For further explanation see Chapter 6 of the NIOSH criteria document on pesticides (Criteria for a recommended standard: occupational exposure during the manufacturing and formulation of pesticides, DHEW (NIOSH) Publication No. 78-174, NTIS No. PB-81-227-001).

2,6-Bis((dimethylamino)methyl)cyclohexanone
N,N-Bis(2-hydroxyethyl) lauramide
Bismuth subgallate
Borax
Butoxypolypropylene glycol
beta-Butoxy beta'-thiocyano diethyl ether
N-Butylacetanilide
Butyl 3,4-dihydro-2,2-dimethyl-4-oxo-1,2H-pyran-6-carboxylate
1,3-Butylene glycol
2-Butyl-2-ethyl-1,3-propanediol
N-Butyl-N-ethyl-alpha,alpha,alpha-trifluoro-2,6-dinitro-p-toluidine
p-tert-Butylphenol
p-tert-Butylphenol, potassium salt of
p-tert-Butylphenol, sodium salt of
1-(p-tert-Butylphenoxy)-1-methylethyl 1-chloroethyl sulfite
Butyl p-hydroxybenzoate
Calcium acid methanearsonate
Calcium chloride
Calcium chlorate
Calcium naphthenate
Calcium phosphate
Calcium thiosulfate
Camphor
Camphor oil
Canadian balsam
Capsaicin (in oleoresin of capsicum)
Carbon
Castor oil
Cedar leaf oil
Cedarwood oil
Chloramine B
Chloramine T
Chlorbromuron
Chlorobutanol
Chloroneb
0-(3-Chloro-4-nitorphenyl) 0,0-dimethyl phosphorothioate
p-Chlorophenyl phenyl sulfone
p-Chlorophenyl 2,4,5-trichlorophenyl sulfide
Chloropropylate
5-Chlorosalicylanilide
2-Chloro-2"-(2,4,6-trichlorophenocy)diethyl ether
Chloroxuron
6-(and 2)-Chloro-3,4-xylyl methylcarbamate
Chromic acetate
Citral
Citric acid
Cobalt naphthenate
Cod liver oil
Copper acetate
Copper ammonium carbonate
Copper chloride, basic
Copper chloride (dihydrate)

Copper dehydroarietyl ammonium 2-ethylhexoate
Copper ethylenediaminotetraacetate
Copper 2-ethylhexoate
Copper hydroxide
Copper hydroxynaphthenate
Copper linoleate
Copper oxalate
Copper oxychloride
Copper oxychloride sulfate
Copper pyrophosphate
Copper salts of the acids of tall oil
Copper sulfate monohydrate
Copper sulfate pentahydrate
Cottonseed oil
Cupric ferric subsulfate complex
Cupric zinc sulfate complex, basic
Cuprous thiocyanate
Cyanogen chloride
Cyclohexane
Cyclohexanone
2-Cyclohexylcyclohexanol
Cyprazine
2,4-D, alkyl amine salt of (as in tall oil fatty acids)
2,4-D, alkyl amine salt of (C12)
2,4-D, alkyl amine salt of (C13)
2,4-D, ammonium salt of
2,4-D, amyl(pentyl) ester of
2,4-D, butoxyethoxypropyl ester of
2,4-D, butoxyethyl ester of
2,4-D, butoxypolyethoxypropyl ester of
2,4-D, butoxypropyl ester of
2,4-D, diethanolamine salt of
2,4-D, diethylamine salt of
2,4-D, diethylethanolamine salt of
2,4-D, diisopropylamine salt of
2,4-D, N,N-dimethyloleylamine salt of
2,4-D, N,N-dimethyl oleyl-linoleyl amine salt of
2,4-D, dipropylene glycol isobutyl ether ester of
2,4-D, ethanolamine salt of
2,4-D, ethoxyethoxyethyl ester of
2,4-D, ethoxyethoxypropyl ester of
2,4-D, ethylamine salt of
2,4-D, ethylene glycol butyl ether ester of
2,4-D, ethyl ester of
2,4-D, heptylamine salt of
2,4-D, issoctyl (2-ethyl-4-methylpentyl) ester of
2,4-D, isopropanolamine salt of
2,4-D, isopropylamine salt of
2,4-D, isobutyl ester of
2,4-D, Linoleylamine salt of
2,4-D, methylamine salt of
2,4-D, methyl ester of

2,4-D, morpholine salt of
2,4-D, octylamine salt of
2,4-D, oleylamine salt of
2,4-D, polyethylene glycol 200 ester of
2,4-D, polypropoxybutyl ester of
2,4-D, polypropylene glycol ester of
2,4-D, propylamine salt of
2,4-D, propylene glycol butyl ether ester of
2,4-D, propylene glycol isobutyl ether ester of
2,4-D, propylene glycol ester of
2,4-D, sodium salt of
2,4-D, triethylamine salt of
2,4-D, triisopropanolamine salt of
2,4-D, trimethylamine salt of
2,4-D, tripropyleneglycol isobutyl ether ester of
2,4-D, tetrahydrofurfuryl ester of
Dalapon
Dalapon, diethyleneglycol ester of
Dalapon, magnesium salt of
Dalapon, sodium salt of
Daminozide
2,4-DB, butoxyethanol ester of
2,4-DB, butyl ester of
2,4-DB, isooctyl ester of
Decachlorobis(2,4-cyclopentadiene-1-yl)
Dehydroabietylamine
Dehydroabietylamine acetate
Dehydroabietylamine-ethylene oxide condensate
Dehydroabietyammonium pentachlorophenoxide
Dehydroabietylammonium phenoxide
Derris resins
Dextrin
Diacetone alcohol
1,5-Diamino-2,2-difluorohexane
20,25-Diazachlolestenol dihydrochloride
2,3-Dibromopropionaldehyde
3,5-Dibromosalicylanilide
4',5-Dibromosalicylanilide
3,5-Dibromo-3'-(trifluoromethyl)salicylanilide
2,6-Di-tert-butyl-p-cresol
Dibutyl succinate
2,6-Di-tert-butyl-p-tolyl methylcarbamate
Dicamba, and esters and salts
Dichlormate
S-(2,3-Dichloroallyl) diisopropylthiocarbamate
Dichlorodifluoromethane
3,4-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide
4,4'-Dichloro-alpha-methylbenzhydrol
2',5-Dichloro-4'-nitrosalicylanilide, 2-aminoethanol salt of
2,4'-Dichlorophenyl ester of benzenesulfonic acid
p-(N,N-Dichlorosulfamoyl)benzoic acid
Dicryl

Dicycloypentadiene-linseed oil copolymer
Di(dehydroabiety)amine acetate
Diethanolamine myristate-iodine complex
2-(2-(2-N,N-Diethylamino)ethoxy)bornane
N,N Diethyl 2 (1-naphthalenyloxy)propionamide
Diethyl 4,4'-0-phenylenebis (3-thioallophanate)
Dihydroabietylamine acetate
5,10-Dihydro-5,10-dioxonaphtho(2,3-8)-p-dithiin-2,3-dicarbonitrile
Dihydrorotenone
N,N-Di(hydroxyethyl)alkyl amine (as in soybean fatty acids)
5,7-Diiodo-8-quinolinol
Diisobutylphenoxyethanol
Dilauryl dimethyl ammonium bromide
Dimethrin
2-(Dimethylamino)-4,5-dimethyl-4-pyrimidinyl dimethylcarbamate
4-(Dimethylamino)-m-tolyl methylcarbamate
2,6-Diemethyl-m-dioxan-4,o1 acetate
N,N-Dimethyldodecylamine acetate
Dimethyl isopropylaminophenanthrene
Dimethyl ((4-methyl-1,3-phenylenebis(iminocarbonyl-1H-benzimidazole-1,2-diyl))biscarbamate
N'-(2,4-Dimethylphenyl)-N-(((2,4-dimethylphenyl)imino)methyl)-N-methanimidamide
Dimethyl phthalate
2,4-Dinitro-6-octyl phenyl crotonate, 2,6-dinitro 4-octyl phenyl crotonate, and nitrooctylphenols (principally dinitro)
Di-n-propylmaleate isosatrole condensate
Dioctyl sodium sulfosuccinate
Dipropetryn
Dipropylene glycol
Dipropylene glycol methyl ether
Dipropyl insocinchommmeronate
Disodium cyanodithioimidocarbonate
Disodium dihydroxyethyl ethylenediamine diacetate
Disodium 4-dodecyl-2,4'-oxydibenzenesulfonate
Disodium N-(2-hydroxyethyl)iminodiacetate
Disodium monoethanolamine phosphate
Disodium octaborate tetrahydrate
Disodium 2,2'-oxybis(4-dodecylbenzenesulfonate)
2,2'-Dithiobisbenzothiazole
Beta,beta'-dithiocyano diethyl ether
Dodecyldiethylamine
Dried blood
Essential oils or perfume
Ester gums
Ethanolamine
Ethiolate
2-Ethoxyethyl-p-methoxycinnamate
Ethoxylated monoethanolamine of lauric acid
Ethoxylated lanolin
Ethyl acetate
Ethyl p-aminobenzoate
2-(Ethylamino)-4-(isopropylamino)-6-methoxy-S-triazine
S-Ethyl cyclohexylethylthiocarbamate

S-Ethyl diisobutylthiocarbamate
Ethyl alpha-((dimethoxyphosphinothionyl)thio) benzeneacetate
Ethylenediaminetetraacetic acid, and esters and salts
Ethylene glycol
Ethylene glycol bis(trichloroacetate)
Ethylene glycol ether of pinene
Ethylene glycol monomethyl ether
1-Ethyl-2-heptadecenyl-1-(2-hydroxyethyl) imidazolinium bromide
2-Ethyl-1,3-hexanediol
2-Ethylhexoate salt of magnesium quinolinolate
Ethyl p-hydroxybenzoate
N-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamide
Fenuron
Ferbam
Ferric sulfate
Ferrous ammonium sulfate
Fluoridamid, diethanolamine salt of
Fluometuron
Fospirate
Fuel oil
Fumaric acid
Furfural
Gibberellic acid
Gluconic acid
Glycerol
Glyceryl p-aminobenzoate
Glyphosine
Gum resins
Hardwood distillate
Hardwood oil
Heavy aromatic naphtha
Hexachloroacetone
3,4,5,6,7,7-Hexachloro-N-(methylmercuri)-1,2,3,6-tetrahydro-3,6-endomethano-phthalimide
Hexahydro-1,2,5-triethyl-S-triazine
Hexamethylenetetramine
1,1'-Hexamethylene bis(5-(p-chloropheny)giguanide)diacetate
n-Hexanol
Hydrocortisone
Hydrogenated castor oil
Hydroxyethylenediaminetetraacetic acid, sodium salt of
Hydroxyethylethylenediaminetriacetic acid, trisodium salt of
1-(2-Hydroxyethyl)-2-heptadecenylimidazoline
2-Hydroxyethyl octyl sulfide
Ichthammol
Iodine-potassium iodide complex
Isocil
Isooctyl phenoxy polyethoxy ethanol
Isophorone
Isopropalin
Isopropyl-o-cresol
Isopropyl lanolin
Isopropyl myristate

m-Isopropylphenyl methylcarbamate
Isothymoxy chloroethyl ether
Juniper tar
Kerosene or deodorized base oil
Lanolin
Larkspur alkaloid
N-Lauroyl ester of colaminoformylmethylpyridinium chloride
Lauryl alcohol
Lauryl diethanolamide
N-Lauryl diethylene triamine
Lauryl isoquinolinium bromide
Lauryl methacrylate
Limonene
Linseed oil
Linuron
Lithium stearate
Magnesium chloride
Magnesium fluosilicate
Magnesium lauryl sulfate
Magnesium silicate
Magnesium sulfate
Magnesium trichloroacetate
Malachite green
Manganous benzothiazylmercaptide
Manganous dimethyl dithiocarbamate
Methapyrilene hydrochloride
Methoprene
Methoxychlor
1-Methoxy-4-propenylbenzene
Methyl 2-chloro-9-hydroxyfluorene-9-carboxylate 65-70%, methyl 9-hydroxy-fluorene-9-carboxylate 11-13%, methyl 2,7-dichloro-9-hydroxyfluorene-9-carboxylate 12-19%
Methyl-2-2,3-dibromopropionate
Methyl 3-(dimethoxy phosphinyl)oxy crotonate, alpha isomer and related compounds
Methylene blue
Methyl p-hydroxybenzoate
2-Methyl-1-naphthaleneacetamide
2-Methyl-1-naphthaleneacetic acid
Methyl napthalene sulfonate
2-Methyl-2,4-pentanediol
3-(2-Methylpiperidino)propyl 3,4-dichlorobenzoate
6-Methyl-2,3-quinoxalinedithiol cyclic S,S-dithiocarbonate
Methylrosaniline chloride
Methyl salicylate
4-(Methylsulfonyl)-2,6-dinitro-N,N-dipropylaniline
2,2'-(1-Methyltrimethylenedioxy)bis(4-methyl-1,3,2-dioxaborinane)
Metobromuron
Mineral spirits
Mixed alkyl pyridines
Monoammonium acid methanearsonate
Monoethanolamides of the fatty acids of coconut oil
Monoethanolamine laurate
Monoethanolamine oleate

Monosodium acid methanearsonate
Monosodium phosphate
Morpholine
Morpholine polyethoxyethanol
1-Naphthaleneacetamide
Naphthalene
beta-Naphthol
Neburon
Neomycin
Neomycin sulfate
Nickel sulfate hexahydrate
Nitrilotriacetic acid, trisodium salt of
Nitrocellulose
N(alpha-(1-Nitroethyl)benzyl)ethylenediamine, potassium salt of
2-Nitro-2-methyl-1,3-propanediol
p-Nitrophenol
Nonylphenoxypolyethoxyethanol
Norbormide
Norea
Norflurazon
Octachlorohexahydro-4,7-methanoisobenzofuran
Octamethylpyrophosphoramide
Octanoic acie ester of 3,5-dibromo-4-hydroxybenzonitrile
Octylammonium methanearsonate
N-Octyl bicyclohepten dicarboximide
Octylphenol
Octyphenoxypolyethoxyethanol-iodine complex
N-Octyl sulfoxide of isosafrole
Oil camphar sassafrassy
Oil of anise
Oil of eucalyptus
Oryzalin
2,2'-Oxybis(4,4,6-trimethyl-1,3,2-dioxaborinane)
Oxycarboxin
Oxyethylated-tert-butylphenol
Oxytetracycline
Paloja
Pentachlorodihydroxytriphenylmethanesulfonic acid
Pentane
1-Pentanethiol
Pentasodium diethylenetriamine acetate
Piperazine-carbon disulfide complex
Petroleum resins
Phenarsazine chloride
Phenolic-tung oil varnish
Phenolsulfonic acid
3-Phenyl-1,1-dimethylurea trichloroacetate
N-(1-Phenyl-2-nitropropyl) piperazine, potassium salt of
Picloram, and esters and salts
Pinene
Piperazine dihydrochloride
Piperonal bis(2-(2-butoxethoxy)ethyl) acetal

Polyamidohygrostreptin
Polychlorobicyclopentadiene isomers(chlorine content 60-62% or 62-64%)
Polyethoxypolypropoxypolyethoxyethanol,N-alkyl di(beta-hydroxyethyl) benzyl ammonium chloride-iodine complex (54% C12, 18% C14, 9% C18, 9% C16, 5% C10, 5% C8)
Polyethoxypolypropoxypolyethoxyethanol-N-alkyl dimethyl-3,4-dichlorbenzyl ammonium chloride-iodine complex (50% C12m 30% C14, 17% C16, 3% C18)
Polyethoxypolypropoxypolyethoxy ethanol-iodine complex
Polyethylene
Polyethylene condensate with abietylamine
Polyethylene glycol distearate
N-Polyethylene polyamine (18-mole) N-oleylamine hydrochloride
Polyisobutylene
Polymerized glyceryl oleate
Polyoxyethylene sorbitan monolaurate
Polyoxyethylene sorbitan monooleate
Polyoxyethylene sorbitol mixed ether ester of
Polyoxyethylene sorbitol oleate-laurate
Polypropylene glycol
Polyvinylpyrrolidone
Polyvinylpyrrolidone-iodine complex
Potassium bisulfate
Potassium bromide
Potassium carbonate
Potassium dodecylbenzene sulfonate
Potassium fish oil soap
Potassium hydroxide
Potassium iodate
Potassium iodide
Potassium laurate
Potassium N-methyldithiocarbamate
Potassium myristate
Potassium nitrate
Potassium peroxymonosulfate
Potassium persulfate
Potassium phosphate, monobasic
Potassium phosphate, tribasic
Potassium polysulfide
Potassium ricinoleate
Potassium tetrathionate
Potassium thiosulfate
Potassium toluene sulfonate
Potassium xylene sulfonate
Prometryn
Propanol
Propazine
S-Propyl butylethylthiocarbamate
S-Propyl dipropylthiocarbamate
Propylene dichloride
Propylene glycol
Propyl 4-hydroxybenzoate
Propyl 4-hydroxybenxoate, sodium salt of
Putrescent whole egg solids

Pyrazon
Pyridine
7-Quinolinol
8-Quinolinol benzoate
8-Quinolinol sulfate
Quinone
2,3-Quinoxalinedithiol cyclic trithiocarbonate
Rosin oil
Rutralin
Ryania speciosa, powdered stems of
Ryanodine
Safrole
Salicylanilide
Selenium disulfide
Sesame oil
Siduron
Silica, amorphous, gel
Silver
Silver salt of partially polymerized mannuronic acid
Silver thiuronim acrylate co-polymer
Soap
Sodium alkyl benzene sulfonate (100% C9)
Sodium benzoate
Sodium bromide
Sodium carbonate
Sodium chloride
Sodium 5-chloro-2-(4-chloro-2-(3-(3,4-dichlorophenyl)oreido)phenoxy) benzene sulfonate
Sodium n-cyclohexyl-n-palmitoyl taurate-iodine complex
Sodium decyl diphenylether disulfonate
Sodium decylbenzene sulfonate
Sodium dehydroacetate
Sodium diacetate
Sodium di(1-alkenyl)phenoxybenzene disulfonate (100% C9-C10)
Sodium dihydroxyethylglycine
Sodium diisopropylnaphthalene sulfonate
Sodium di(monoethanolamine)phosphate
Sodium dodecylbenzenesulfonate
Sodium dodecylbensenesulfonate-iodine complex
Sodium dodecyl diphenyl oxide sulfonate
Sodium ethylmercurithiosalicylate
Sodium glycolate
Sodium laurate
Sodium N-lauryl sarcosinate
Sodium lauryl sulfate
Sodium metaborate
Sodium metasilicate
Sodium methyl oleyl taurate
Sodium methylundecyl benzene sulfonate
Sodium mono(1-alkenyl)phenoxybenzene disulfonate (100% C9-C10)
Sodium mono and dimethyl naphthalene sulfonate
Sodium nitrate
Sodium nitrite

Sodium octylbenzene sulfonate
Sodium oleate
Sodium perborate
Sodium persulfate
Sodium phenate
Sodium o-phenylphenate
Sodium p-phenylphenate
Sodium polyethoxyethyl dodecylsulfate
Sodium polysulfide
Sodium salt of petroleum sulfonic acid
Sodium silicate
Sodium sulfate
Sodium sulfite
Sodium sulforicinoleate
Sodium tetrachlorophenate
Sodium thiosulfate
Sodium tridecylbenzene sulfonate
Sodium tripolyphosphate
Sodium xylene sulfonate
Sorbic acid
Sorbic acid, potassium salt of
Soybean oil
Sperm oil
Squalane
Sulfacetamide
Sulfanilamide
Sulfathiazole
Sulfonated cresol
Sulfonated oleic acid, sodium salt of
Sulfonated vegetable oil
Tannic acid
Tar
Tebuthiuron
Terbacil
Terbuthylazine
Terbutryn
Terpineols
Teramaycin or oxytertracycline hydrochloride
Tetracaine hydrochloride
1,3,4,6-Tetrachloroglycoluril and related compounds
3,3',4',5-Tetrachlorosalicylanilide
Tetrachlorothiophene
Tetrahydroabiethylamine acetate
Tetrahydro-3,4-dimethyl-2H-1,3,5-thiadiazine-2-thione, sodium salt of
Tetralin
Tetramethrin
Tetrapotassium pyrophosphate
Tetrasodium ethylene diaminetetraacetate
Tetrasodium pyrophosphate
Thallium sulfate
2,2'-Thiobis(4-chlorophenol)
2,2'-Thiobis(4-chloro-6-methylphenol)

2,2'-Thiobis(4,5-dichlorophenol)
beta-Thiocyanoethyl esters of mixed fatty acids (C10-C18)
Thionazin
Thiophanate-methyl
Thymol
Thymoxydichloroacetic acid
Tobacco dust
Toluene
Toluene sulfonic acid
Toluene sulfonic acid, sodium salt of
Tributyl-2,4-(dichlorobenzyl)phosphonium chloride
Tributyltin isopropyl succinate
Tributyltin linoleate
Tributyltin salicylate
S-2,3,3-Trichloroallyl diisopropylthiocarbamate
1,2,4-Trichlorobenzene
2,3,6-Trichlorobenzoic acid
2,3,6-Trichlorobenzoic acid, sodium salt of
Trichlorobenzyl chloride
1-((2,3,6-Trichlorobenzyl)oxy)-2-propanol
3,4,4'-Trichlorocarbanilide
1,1,1-Trichloroethane
Trichloromonofluoromethane
Trichloromelamine
2,4,6-Trichlorophenol, potassium salt
2,3,6-Trichlorophenylacetic acid
2,3,6-Trichlorophenylacetic acid, ammonium salt of
2,3,6-Trichlorophenylacetic acid, dimethylamine salt of
2,3,6-Trichlorophenylacetic acid, sodium salt of
2,4,5-Trichlorophenol, potassium salt
1,4',5'-Trichloro-2'-(2,4,5-trichlorophenoxy)methanesulfonanilide, sodium salt of
Tricosene
Triethanolamine
Triethanolamine dodecylbenzene sulfonate
Triethanolamine laurate
Triethanolamine myristate
Triethanolamine octylsulfate-iodine complex
Triethanolamine oleate
Triethanolamine salt of lauryl sulfate
Triethanolamine sulfonate tridecylpolyoxyethyleneethanol-bromine complex
2,3,5-Triiodobenzoic acid
2,3,5-Triiodobenzoic acid, dimethylamine salt of
Triisopropanolamine
Triisopropylamine
2,2,4-Trimethyl-1,3-pentanediol
Turkey red oil or sulfonated castor oil
Turpentine
Tyrothricin
Undecylenic acid
Urea
Vegetable wax
2,4-Xylenesulfonic acid

2,4-Xylenol
Zinc chloride
Zinc dehydroabietylammonium 2-ethylhexoate
Zinc 2-ethylhexoate
Zinc oxide
Zinc phenol sulfonate
Zinc 8-quinolinolate
Zinc resinate
Ziram, cyclohexylamine complex
Zirconium oxide

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