

INVESTIGATION HEALTH AND SAFETY PLAN

Prepared By:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

HEALTH AND SAFETY PLAN

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STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the planned Subsurface Investigation activities.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the subsurface investigation to be performed to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during subsurface investigation activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this HASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The HASP may be revised by EBC at the request of the client and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.

Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

1.2 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.3 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mr. Keith Butler	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000
Mr. Tom Gallo	Site Safety Officer	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000
Mr. James Balado	C2 Environmental Corp. Equipment Operator	18-36 42 nd Street, Astoria, NY	(516) 253-8489

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this HASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this HASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this HASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

2.0 SITE BACKGROUND AND SCOPE OF WORK

The results from the investigation activities will help determine what actions may be required, if any, to prevent exposure to contaminants. The work will be conducted in accordance with the procedures as required by the New York State Brownfield Cleanup Program (NYSBCP) as administered by the New York State Department of Environmental Conservation.

2.1 Investigation Scope

The investigation will include the collection of subslab, indoor and outdoor air samples at one or more off-site residential buildings.

3.0 SITE HAZARD EVALUATION

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

This HASP has been developed for work performed at the site in association with a Phase II subsurface investigation. The primary hazards to the field crew will be physical hazards related to sample collection procedures and equipment, and chemical exposures to the sampling crew from exposure to potential contaminants which may be present at the site.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Cuts and Lacerations

Field activities that involve drilling and boring equipment may result in cuts or lacerations from machinery and tools used in collecting samples, cutting disposable tubing and opening acetate sleeves and liners. A first aid kit approved by the American Red Cross will be available during all subsurface investigative activities.

3.1.3 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers and drillers may be required to lift heavy objects such as drilling tools, buckets of decontamination water, cement, etc. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.4 Utility Hazards

Before conducting any subsurface boring or sampling, the drilling contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.5 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The drilling contractor shall carry on his operations without undue interference or delays to traffic. The drilling contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention

- a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
- b. Work in Pairs. Individuals should avoid undertaking any activity alone.
- c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
- d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment

- a. Heat Rash (or prickly heat):
Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
Treatment: Remove source of irritation and cool skin with water or wet cloths.
- b. Heat Cramps (or heat prostration)
Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
- c. Heat Stroke
Cause: Same as heat exhaustion. This is also an extremely serious condition.

- Symptoms: Dry and hot skin, dry mouth, dizziness, nausea, headache and rapid pulse.
- Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

Based on the findings of previous investigations, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs) related to chlorinated solvents, semi-volatile organic compounds (SVOCs) related to historic fill, pesticides / PCBs related to fill and heavy metals such as barium, lead and mercury related to historic fill materials.

The primary routes of exposure to these contaminants are inhalation, ingestion and absorption. **Appendix C** includes information sheets for suspected chemicals that may be encountered at the site.

3.3.1 Respirable Dust and Direct Contact with Soil and Groundwater

Dust may be generated from drilling activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than the OSHA action level of 100 $\mu\text{g}/\text{m}^3$ over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soil and groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Organic Vapors

Considering the past and present use of the properties, VOCs may be encountered at the site in soil and/or groundwater. Therefore, soil boring activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during drilling activities to determine whether organic vapor concentrations exceed action levels shown below.

PID Response	Action
Sustained readings of 5 ppm or greater	Shut down equipment and allow area to vent. Resume when readings return to background
Sustained readings of 5 ppm or greater that do not subside after venting	Implement Vapor Release Plan (Section 6.8). Re-evaluate respiratory protection as upgrade may be required.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- high visibility safety vest;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- high visibility safety vest;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade (i.e. dust above 5,000 $\mu\text{g}/\text{m}^3$ or sustained VOCs above 5 ppm in the breathing zone) the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of excavations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

5.0 SITE CONTROL

5.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book. **It is expected that for soil boring and sampling activities, identification of an exclusion zone, decontamination zone, and support zone will not be necessary.**

Tasks requiring OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

6.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

6.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

6.2 Emergency Telephone Numbers

General Emergencies	911
New York City Police	911
Interfaith Medical Center Emergency Rm	1-718-613-4444
NYSDEC Spills Division	1-800-457-7362
NYSDEC Division of Env. Remediation	1-718-482-4900
NYCDEP	1-718-699-9811
NYC Department of Health	1-212-788-4711
NYC Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Site Safety Officer	1-631-504-6000
Alternate Site Safety Officer	1-631-504-6000

6.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;
- Ensure that appropriate federal, state, and local agencies are informed and emergency

response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager Mr. Keith Butler (631) 504-6000
- Site Safety Officer Mr. Tom Gallo (631) 504-6000
- Alternate Mr. Anthony Balado (631) 504-6000

6.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**) and information on the chemical(s) to which they may have been exposed (**Appendix C**).

6.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

6.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

6.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

6.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A
SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Person Conducting Briefing: _____

Project Name and Location: _____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc...):

2. OTHER ISSUES (HASP changes, attendee comments, etc...):

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B
SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

Alternative Procedures: _____

Required Changes in PPE: _____

Project Superintendent (signature)

Date

Health and Safety Consultant (signature)

Date

Site Safety Officer (signature)

Date

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

Material Safety Data Sheet

cis-1,2-Dichloroethylene, 97%

ACC# 97773

Section 1 - Chemical Product and Company Identification

MSDS Name: cis-1,2-Dichloroethylene, 97%

Catalog Numbers: AC113380000, AC113380025, AC113380100

Synonyms: cis-Acetylene dichloride.

Company Identification:

Acros Organics N.V.

One Reagent Lane

Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
156-59-2	cis-1,2-Dichloroethylene	97	205-859-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear liquid. Flash Point: 6 deg C.

Warning! Flammable liquid and vapor. Harmful if inhaled. Unstabilized substance may polymerize. Causes eye and skin irritation. May be harmful if swallowed. May cause respiratory tract irritation.

Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes moderate eye irritation.

Skin: Causes moderate skin irritation. May cause dermatitis.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed. May cause central nervous system depression.

Inhalation: May cause respiratory tract irritation. May cause narcotic effects in high concentration. Eye irritation, vertigo, and nausea were reported in humans exposed at 2200 ppm.

Chronic: Not available. Some German investigators reported fatty degeneration of the liver upon repeated narcotic doses in rats and

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Fire or excessive heat may result in violent rupture of the container due to bulk polymerization. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Hazardous polymerization may occur under fire conditions.

Extinguishing Media: Use water fog, dry chemical, carbon dioxide, or regular foam.

Flash Point: 6 deg C (42.80 deg F)

Autoignition Temperature: 440 deg C (824.00 deg F)

Explosion Limits, Lower: 9.70 vol %

Upper: 12.80 vol %

NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 2

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Pure vapor will be uninhibited and may polymerize in vents or other confined spaces.

Storage: Keep away from sources of ignition. Store in a tightly closed container. Flammables-area. Store protected from light and air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
cis-1,2-Dichloroethylene	200 ppm TWA	none listed	none listed

OSHA Vacated PELs: cis-1,2-Dichloroethylene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear
Odor: Pleasant odor
pH: Not available.
Vapor Pressure: 201 mm Hg @ 25 deg C
Vapor Density: 3.34 (air=1)
Evaporation Rate:Not available.
Viscosity: Not available.
Boiling Point: 60 deg C @ 760 mm Hg
Freezing/Melting Point:-80 deg C
Decomposition Temperature:Not available.
Solubility: Insoluble.
Specific Gravity/Density:1.2800
Molecular Formula:C2H2Cl2
Molecular Weight:96.94

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. This material is a monomer and may polymerize under certain conditions if the stabilizer is lost.
Conditions to Avoid: Light, ignition sources, exposure to air, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong bases, copper.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: May occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 156-59-2: KV9420000
LD50/LC50:
CAS# 156-59-2:
Inhalation, rat: LC50 = 13700 ppm;
Carcinogenicity:
CAS# 156-59-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	1,2-DICHLOROETHYLENE
Hazard Class:		3
UN Number:		UN1150
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 156-59-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 156-59-2 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F

Risk Phrases:

R 11 Highly flammable.
R 20 Harmful by inhalation.
R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 7 Keep container tightly closed.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 156-59-2: No information available.

Canada - DSL/NDSL

CAS# 156-59-2 is listed on Canada's NDSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information
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MSDS Creation Date: 2/09/1998

Revision #5 Date: 3/16/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076



1,1,2,2-Tetrachloroethylene
 Perchloroethylene
 Tetrachloroethene
 $C_2Cl_4 / Cl_2C=CCl_2$
 Molecular mass: 165.8

ICSC # 0076
 CAS # 127-18-4
 RTECS # [KX3850000](#)
 UN # 1897
 EC # 602-028-00-4
 April 13, 2000 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles , face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,(see Chemical Dangers), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0076

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TETRACHLOROETHYLENE

ICSC: 0076

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour is heavier than air.</p> <p>CHEMICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004). MAK: skin absorption (H); Carcinogen category: 3B; (DFG 2004). OSHA PEL⁺: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours) NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A NIOSH IDLH: Ca 150 ppm See: 127184</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 121°C Melting point: -22°C Relative density (water = 1): 1.6 Solubility in water, g/100 ml at 20°C: 0.015</p>	<p>Vapour pressure, kPa at 20°C: 1.9 Relative vapour density (air = 1): 5.8 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09 Octanol/water partition coefficient as log Pow: 2.9</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

<p>ICSC: 0076</p>	<p>TETRACHLOROETHYLENE</p>
<p>(C) IPCS, CEC, 1994</p>	

<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only</p>
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International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081



1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
 C_2HCl_3 / $CICH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # [KX4550000](#)
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION		Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
• INHALATION	Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
• SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the

ICSC: 0081

OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p>CHEMICAL DANGERS: On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene , hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007). OSHA PEL[†]: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours) NIOSH REL: Ca See Appendix A See Appendix C NIOSH IDLH: Ca 1000 ppm See: 79016</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 87°C Melting point: -73°C Relative density (water = 1): 1.5 Solubility in water, g/100 ml at 20°C: 0.1 Vapour pressure, kPa at 20°C: 7.8 Relative vapour density (air = 1): 4.5</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3 Auto-ignition temperature: 410°C Explosive limits, vol% in air: 8-10.5 Octanol/water partition coefficient as log Pow: 2.42 Electrical conductivity: 800pS/m</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;

Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.

Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

ADDITIONAL INFORMATION

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385



1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # [CV9275000](#)
EC # 601-033-00-9
October 23, 1995 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ICSC: 0385

BENZ(a)ANTHRACENE

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS:	EFFECTS OF SHORT-TERM EXPOSURE:
	OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none	Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
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ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood.	
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NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

ICSC: 0385	BENZ(a)ANTHRACENE
(C) IPCS, CEC, 1994	

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104



Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
 $C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0104
CAS # 50-32-8
RTECS # [DJ3675000](#)
EC # 601-032-00-3
October 17, 2005 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

<p>I M P O R T A N T A D V I S I O N</p>	<p>PHYSICAL STATE; APPEARANCE: PALE-YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts with strong oxidants causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005). MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm³</p>	<p>Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

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ICSC: 0104	(C) IPCS, CEC, 1994	BENZO(a)PYRENE
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<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720



Benz(e)acephenanthrylene
2,3-Benzofluoranthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
 $C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0720
CAS # 205-99-2
RTECS # [CU1400000](#)
EC # 601-034-00-4
March 25, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation
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PHYSICAL DANGERS:

CHEMICAL DANGERS:

Upon heating, toxic fumes are formed.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: A2 (suspected human carcinogen); (ACGIH 2004).

MAK:

Carcinogen category: 2;
(DFG 2004).

of its aerosol and through the skin.

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481°C
Melting point: 168°C
Solubility in water:
none

Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality.



NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0720

BENZO(b)FLUORANTHENE

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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International Chemical Safety Cards

CHRYSENE

ICSC: 1672



Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # [GC0700000](#)
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Aqua-Cancer Suspected of causing cancer Very toxic to aquatic life with long lasting effects Very toxic to aquatic life

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO BEIGE CRYSTALS OR POWDER</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
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<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³</p>	<p>Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9</p>
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<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

ADDITIONAL INFORMATION

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ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431



1,25,6-Dibenzanthracene
 $C_{22}H_{14}$
 Molecular mass: 278.4

ICSC # 0431
 CAS # 53-70-3
 RTECS # [HN2625000](#)
 EC # 601-041-00-2
 October 23, 1995 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.		Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0431		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

<p>I</p> <p>M</p> <p>P</p> <p>O</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALLINE POWDER.</p> <p>PHYSICAL DANGERS:</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration</p>
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CHEMICAL DANGERS:

of airborne particles can, however, be reached quickly.

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 524°C
Melting point: 267°C
Relative density (water = 1): 1.28

Solubility in water:
none
Octanol/water partition coefficient as log Pow: 6.5

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.



NOTES

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH).

ADDITIONAL INFORMATION

ICSC: 0431

DIBENZO(a,h)ANTHRACENE

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International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730



o-Phenylenepyrene
2,3-Phenylenepyrene
 $C_{22}H_{12}$
Molecular mass: 276.3

ICSC # 0730
CAS # 193-39-5
RTECS # [NK9300000](#)
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

I	PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
M	PHYSICAL DANGERS:	INHALATION RISK:
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CHEMICAL DANGERS:
Upon heating, toxic fumes are formed.

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK:
Carcinogen category: 2;
(DFG 2004).

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 536°C
Melting point: 164°C
Solubility in water:
none

Octanol/water partition coefficient as log Pow: 6.58

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish.



NOTES

Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0730

INDENO(1,2,3-cd)PYRENE

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International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667



Naphthene
C₁₀H₈

Molecular mass: 128.18

ICSC # 0667
CAS # 91-20-3
RTECS # QJ0525000
UN # 1334 (solid); 2304 (molten)
EC # 601-052-00-2
April 21, 2005 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 80°C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• SKIN	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	Rinse skin with plenty of water or shower.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol. N symbol. R: 22-40-50/53. S: 2-36/37-46-60-61. UN Hazard Class: 4.1. UN Packing Group: III.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

NAPHTHALENE

ICSC: 0667

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: On combustion, forms irritating and toxic gases. Reacts with strong oxidants</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 10 ppm as TWA 15 ppm as STEL (skin) A4 (not classifiable as a human carcinogen); (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004). OSHA PEL: TWA 10 ppm (50 mg/m³) NIOSH REL: TWA 10 ppm (50 mg/m³) ST 15 ppm (75 mg/m³) NIOSH IDLH: 250 ppm See: 91203</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.</p>
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PHYSICAL PROPERTIES	<p>Boiling point: 218°C Sublimation slowly at room temperature Melting point: 80°C Density: 1.16 g/cm³ Solubility in water, g/100 ml at 25°C: none</p>	<p>Vapour pressure, Pa at 25°C: 11 Relative vapour density (air = 1): 4.42 Flash point: 80°C c.c. Auto-ignition temperature: 540°C Explosive limits, vol% in air: 0.9-5.9 Octanol/water partition coefficient as log Pow: 3.3</p>
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ENVIRONMENTAL DATA	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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NOTES

Some individuals may be more sensitive to the effect of naphthalene on blood cells.

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)
NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

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ICSC: 0667

NAPHTHALENE

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International Chemical Safety Cards

PYRENE

ICSC: 1474



Benzo (d,e,f) phenanthrene
beta-Pyrene
 $C_{16}H_{10}$
Molecular mass: 202.26

ICSC # 1474
CAS # 129-00-0
RTECS # [UR2450000](#)
November 27, 2003 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, foam.
EXPLOSION			
EXPOSURE			
• INHALATION		Avoid inhalation of dust	Fresh air, rest.
• SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1474

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

PYRENE

ICSC: 1474

I M	PHYSICAL STATE; APPEARANCE: YELLOW COLOURLESS SOLID IN VARIOUS FORMS	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation through the skin and by ingestion
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PHYSICAL DANGERS:

CHEMICAL DANGERS:

The substance decomposes on heating producing irritating fumes

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.
MAK not established.

INHALATION RISK:

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

PHYSICAL PROPERTIES

Boiling point: 404°C
Melting point: 151°C
Density: 1.27 g/cm³

Solubility in water: 0.135 mg/l at 25°C
Vapour pressure, Pa at °C: 0.08
Octanol/water partition coefficient as log Pow: 4.88

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in crustacea, in fish, in milk, in algae and in molluscs. It is strongly advised that this substance does not enter the environment.



NOTES

Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.

ADDITIONAL INFORMATION

ICSC: 1474

PYRENE

(C) IPCS, CEC, 1994

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72-55-9 msds



MSDS 250,000+

MSDS : 2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%

CAS : 72-55-9

SYNONYMS : p,p'-DDE ; ethylene,1,1-dichloro-2,2-bis-(p-chlorophenyl)- ; DDT dehydrochloride ; DDE; 1-1'-(Dichloroethenylidene)bis(4-chlorobenzene)

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[2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99% 72-55-9]

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Not Available

Buyers:

Not Available

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**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

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| CAS# | Chemical Name | % | EINECS# |
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| 72-55-9 | 2,2-Bis-(4-chlorophenyl)-1,1-dichloro | 99 | 200-784-6 |
| ethylene | | |
+-----+-----+-----+-----+

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Hazard Symbols: XN

Risk Phrases: 22 33

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Harmful if swallowed. Danger of cumulative effects.Cancer suspect
agent.Possible risks of irreversible effects.

Potential Health Effects

Eye:
May cause eye irritation.Skin:
May cause skin irritation.

Ingestion:
May cause irritation of the digestive tract. May be harmful if
swallowed. Ingestion of large amounts may cause liver and/or kidney
damage.

Inhalation:
May cause respiratory tract irritation.

Chronic:
May cause cancer according to animal studies. Adverse reproductive
effects have been reported in animals. Laboratory experiments have
resulted in mutagenic effects.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Flush eyes with plenty of water for at least 15 minutes,
occasionally lifting the upper and lower eyelids. Get medical aid.

Skin:
Get medical aid. Flush skin with plenty of water for at least 15
minutes while removing contaminated clothing and shoes. Wash clothing
before reuse.

Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water.
Never give anything by mouth to an unconscious person. Get medical
aid immediately.

Inhalation:
Remove from exposure and move to fresh air immediately. If not
breathing, give artificial respiration. If breathing is difficult,
give oxygen. Get medical aid.

Notes to Physician:
Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire.

Extinguishing Media:

For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:

Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:

Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not ingest or inhale. Use with adequate ventilation.

Storage:

Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 72-55-9:

Personal Protective Equipment

Eyes:

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:

Wear appropriate protective gloves to prevent skin exposure.

Clothing:

Wear appropriate protective clothing to prevent skin exposure.

Respirators:

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Crystals

Color: white

Odor: None reported.

pH: Not available.

Vapor Pressure: 6.5106 mm Hg @ 20 C

Viscosity: Not available.

Boiling Point: 336 deg C

Freezing/Melting Point: 88.00 - 90.00 deg C

Autoignition Temperature: Not available.

Flash Point: Not available.

Explosion Limits, lower: Not available.

Explosion Limits, upper: Not available.

Decomposition Temperature:

Solubility in water: 0.010 ppm

Specific Gravity/Density:

Molecular Formula: C14H8Cl4

Molecular Weight: 318.02

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:

Stable under normal temperatures and pressures.

Conditions to Avoid:

Incompatible materials, dust generation, strong oxidants.

Incompatibilities with Other Materials:

Strong oxidizing agents - strong bases.

Hazardous Decomposition Products:

Hydrogen chloride, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:

CAS# 72-55-9: KV9450000

LD50/LC50:

CAS# 72-55-9: Oral, mouse: LD50 = 700 mg/kg; Oral, rat: LD50 = 880 mg/kg.

Carcinogenicity:

2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene -

California: carcinogen, initial date 1/1/89

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939



Chlorobiphenyl (54% chlorine)
Chlorodiphenyl (54% chlorine)
PCB
Molecular mass: 327 (average)

ICSC # 0939
CAS # 11097-69-1
RTECS # [TQ1360000](#)
UN # 2315
EC # 602-039-00-4
October 20, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: powder, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION		Ventilation.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Headache. Numbness.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Consult an expert! Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.		Separated from food and feedstuffs . Cool. Dry. Keep in a well-ventilated room.	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Severe marine pollutant. Note: C Xn symbol N symbol R: 33-50/53 S: 2-35-60-61 UN Hazard Class: 9 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0939

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

ICSC: 0939

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: LIGHT YELLOW VISCOUS LIQUID.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes in a fire producing irritating and toxic gases .</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 mg/m³ as TWA; (skin); A3; (ACGIH 2004). MAK: 0.05 ppm, 0.70 mg/m³; H; Peak limitation category: II(8); Carcinogen category: 3B; Pregnancy risk group: B; (DFG 2004). OSHA PEL: TWA 0.5 mg/m³ skin NIOSH REL*: Ca TWA 0.001 mg/m³ See Appendix A *Note: The REL also applies to other PCBs. NIOSH IDLH: Ca 5 mg/m³ See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20° C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis. Chloracne is the most visible effect. The substance may have effects on the liver . Animal tests show that this substance possibly causes toxic effects upon human reproduction.</p>
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PHYSICAL PROPERTIES	<p>Relative density (water = 1): 1.5 Solubility in water: none</p>	<p>Vapour pressure, Pa at 25°C: 0.01 Octanol/water partition coefficient as log Pow: 6.30 (estimated)</p>
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ENVIRONMENTAL DATA	<p>In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms. It is strongly advised not to let the chemical enter into the environment.</p>	
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NOTES

Changes into a resinous state (pour point) at 10°C. Distillation range: 365°-390°C. Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.

Transport Emergency Card: TEC (R)-90GM2-II-L

ADDITIONAL INFORMATION

ICSC: 0939	POLYCHLORINATED BIPHENYL (AROCLOR 1254) (C) IPCS, CEC, 1994
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IMPORTANT LEGAL NOTICE:	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827



Barium sulphate
Blanc fixe
Artificial barite
BaSO₄
Molecular mass: 233.43

ICSC # 0827

CAS # 7727-43-7

RTECS # [CR0600000](#)

October 20, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.			R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0827		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts violently with aluminium powder.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 10 mg/m³ as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m³; (Respirable fraction) 1.5 mg/m³; (DFG 2004). OSHA PEL[†]: TWA 15 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH REL: TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH IDLH: N.D. See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure to dust particles, resulting in baritosis (a form of benign pneumoconiosis).</p>
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PHYSICAL PROPERTIES	<p>Melting point (decomposes): 1600°C Density: 4.5 g/cm³</p>	Solubility in water: none
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ENVIRONMENTAL DATA	
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NOTES

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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ICSC: 0827	BARIUM SULFATE
(C) IPCS, CEC, 1994	

<p>IMPORTANT LEGAL NOTICE:</p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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International Chemical Safety Cards

LEAD

ICSC: 0052



Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # [OF7525000](#)
October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004). MAK: Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004). EU OEL: as TWA 0.15 mg/m³ (EU 2002). OSHA PEL*: 1910.1025 TWA 0.050 mg/m³ See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH REL*: TWA 0.050 mg/m³ See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH IDLH: 100 mg/m³ (as Pb) See: 7439921</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.</p>
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PHYSICAL PROPERTIES	Boiling point: 1740°C Melting point: 327.5°C	Density: 11.34 g/cm ³ Solubility in water: none
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ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.	
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NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.
 Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

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ICSC: 0052	LEAD
(C) IPCS, CEC, 1994	

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International Chemical Safety Cards

MERCURY

ICSC: 0056



Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # [OV4550000](#)
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MERCURY

ICSC: 0056

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m³ Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL_f: C 0.1 mg/m³ NIOSH REL: Hg Vapor: TWA 0.05 mg/m³ skin Other: C 0.1 mg/m³ skin NIOSH IDLH: 10 mg/m³ (as Hg) See: 7439976</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!</p> <p>INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.</p>
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PHYSICAL PROPERTIES	<p>Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none</p>	<p>Vapour pressure, Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009</p>
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ENVIRONMENTAL DATA	<p>The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.</p>	
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NOTES

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

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ICSC: 0056	MERCURY
(C) IPCS, CEC, 1994	

IMPORTANT LEGAL NOTICE:	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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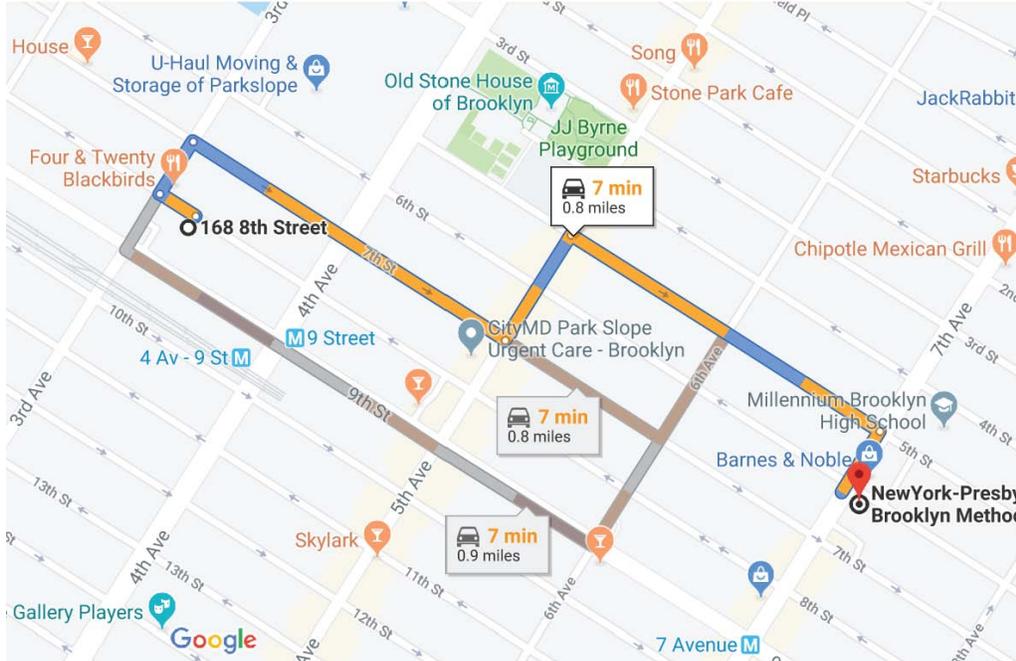
APPENDIX D
HOSPITAL INFORMATION AND MAP
FIELD ACCIDENT REPORT

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

NewYork-Presbyterian Brooklyn Methodist Hospital
506 6th St, Brooklyn, NY 11215
(718) 780-3000

0.8 Miles – About 7 Minutes



168 8th St

Brooklyn, NY 11215

- ↑ 1. Head northwest on 8th St toward 3rd Ave

 177 ft
- 2. Turn right onto 3rd Ave

 262 ft
- 3. Turn right at the 1st cross street onto 7th St

 0.3 mi
- 4. Turn left at the 2nd cross street onto 5th Ave

 0.1 mi
- 5. Use the left lane to turn right at the 2nd cross street onto 5th St

 0.3 mi
- 6. Turn right at the 2nd cross street onto 7th Ave

 302 ft
i Destination will be on the left

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO. _____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

Vehicular Personal Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

Description of Accident _____

Action Taken _____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW