
CONSTRUCTION HEALTH AND SAFETY PLAN

for

**400 and 390 Park Avenue South
New York, New York**

**Tax Map Block 857, Lots 40 and 46
NYCOER Project Number: 12RHAZ083M**

Prepared For:

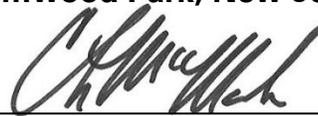
**ET 400 PAS, LLC
c/o Equity Residential
Two N. Riverside Plaza, Suite 400
Chicago, IL 60606-2609**

For Submittal To:

**New York City Office of Environmental Remediation
Brownfields Cleanup Program
100 Gold Street, 2nd Floor
New York, New York 10038**

Prepared By:

**Langan Engineering & Environmental Services, Inc. PC
River Drive Center One
Elmwood Park, New Jersey 07407**



**Chris McMahon
Project Geologist**



**Steven A. Ciambuschini, PG, LEP
Senior Associate / Vice President**

**31 January 2012
100271601**



ENVIRONMENTAL HEALTH AND SAFETY PLAN

Client: **ET 400 PAS, LLC**

Project: **Excavation Activities During Site Work**

Location: **390 and 400 Park Avenue South**

Chemical Hazards: **Volatile Organic Compounds, Polycyclic aromatic hydrocarbons, Metals, Pesticides, Polychlorinated Biphenyls**

Prepared By: **LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, INC.**

Version: **1**

Date : **31 January 2012**

Client Contact: **Robert Piazza**

Langan Project Manager (PM): **Chris McMahon (201)218-2339**

Langan Health & Safety Coordinator (HSC): **Tony Moffa, CHMM (215)491-6545**

Langan Site Safety Officer (SSO): **Field Personnel**

Langan Incident/Injury Hotline: **(201)398-4699**

LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, PC) LANGAN), AND LANGAN SUBCONTRACTORS, DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION BY A TRAINED HEALTH AND SAFETY SPECIALIST.

APPROVALS

By signature, the personnel identified below hereby acknowledge that they have reviewed this Construction Health and Safety Plan (CHASP) and agree to comply with the requirements contained therein as well as the applicable provisions of 29 CFR Parts 1910 and 1926. The undersigned also acknowledge and accept that this CHASP is the project CHASP for the site work described in the Remedial Action Work Plan (RAWP). Furthermore, in reviewing and accepting this CHASP, as currently written, the undersigned agree that to the best of their knowledge, this CHASP adequately identifies the activities and hazards associated with work at this site and describes the appropriate and necessary precautions and protections for site workers required by the applicable OSHA statutes and regulations.



LANGAN Project Manager - PM (Chris McMahon)

7/19/2011

Date



LANGAN Health and Safety Coordinator (Tony Moffa, CHMM)

7/19/2011

Date

LANGAN Site Safety Officer – SSO

Date

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Purpose and Policy	1
1.2	Site Descriptions.....	3
1.3	Scope of Work.....	3
2.0	PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES	4
2.1	Project Manager.....	4
2.2	Health and Safety Coordinator (HSC).....	5
2.3	Site Safety Officer (SSO)	5
3.0	HAZARDS ANALYSIS	7
3.1	General Hazard Assessment	7
3.2	Chemical Exposure Hazards.....	8
3.2.1	Specific Chemical Hazards Previously Detected at the Site.....	8
3.2.2	Chemical Hazard Exposure Routes	8
3.2.3	Control of Exposure to Chemical Hazards	9
3.3	Physical Hazards	9
3.3.1	Temperature Extremes	9
3.3.2	Noise and Air Resources	10
3.3.3	Hand and Power Tools	10
3.3.4	Slips, Trips, and Falls	11
3.3.5	Fire and Explosion	11
3.3.6	Material Handling	11
3.3.1	Confined Space/Excavation Hazards	12
3.3.2	Working Near Equipment	12
3.3.3	Electrical Safety	13
3.3.4	Utilities.....	13
3.3.5	Vehicular Traffic.....	13
3.4	Biological Hazards	13
3.4.1	Animals	13
3.4.2	Insects	14
3.4.3	Wound Care	14
3.5	Task Hazard Analysis.....	14
4.0	PERSONAL PROTECTIVE EQUIPMENT (PPE)	15
4.1	Levels of Protection	15
4.2	Respirator Fit-Test	16
4.3	Respirator Cartridge Change-Out Schedule.....	16

TABLE OF CONTENTS
(Continued)

5.0	AIR QUALITY MONITORING AND ACTIONS LEVELS	17
5.1	Monitoring During Site Operations	17
5.1.1	Volatile Organic Compounds.....	18
5.1.2	SVOCs, Pesticides, and Metals.....	18
5.2	Noise Monitoring	18
5.3	Monitoring Equipment Calibration and Maintenance.....	19
5.4	Determination of Background Levels	19
6.0	COMMUNITY HEALTH AND SAFETY CONSIDERATIONS	19
7.0	WORK ZONES and DECONTAMINATION	20
7.1	Site Control	20
7.2	Contamination Control.....	20
7.2.1	Personnel Decontamination Station	20
7.2.2	Minimization of Contact with Contaminants	21
7.2.3	Personnel Decontamination Sequence.....	21
7.2.4	Emergency Decontamination	21
7.2.5	Hand-Held Equipment Decontamination	22
7.2.6	Heavy Equipment Decontamination	22
7.3	Communications.....	23
8.0	MEDICAL SURVEILLANCE	23
9.0	MEDICAL SURVEILLANCE PROGRAM REQUIREMENTS.....	23
10.0	EMERGENCY RESPONSE PLAN	24
10.1	Responsibilities.....	24
10.1.1	Health and Safety Coordinator (HSC)	24
10.1.2	Site Safety Officer (SSO).....	24
10.1.3	Emergency Coordinator	24
10.1.4	Site Personnel.....	25
10.2	Communications.....	25
10.3	Local Emergency Support Units	25
10.4	Pre-Emergency Planning	26
10.5	Emergency Medical Treatment.....	26
10.6	Emergency Site Evacuation Routes and Procedures.....	27
10.7	Fire Prevention and Protection	27
10.7.1	Fire Prevention	27
10.8	Significant Vapor Release	28
10.9	Overt Chemical Exposure.....	28
10.10	Decontamination During Medical Emergencies	29
10.11	Incident Reporting	29
10.12	Adverse Weather Conditions	30

TABLE OF CONTENTS
(Continued)

10.13	Spill Control and Response	30
10.14	Emergency Equipment	32
10.15	Restoration and Salvage	32
11.0	TRAINING	32
11.1	General Health and Safety Training	32
11.2	Annual Eight-Hour Refresher Training	33
11.3	Site-Specific Training.....	33
11.4	Onsite Safety Briefings.....	33
11.5	First Aid and CPR	33
11.6	Hazard Communication.....	34
12.0	RECORDKEEPING	34
12.1	Field Change Authorization Request.....	34
12.2	Medical and Training Records.....	34
12.3	Onsite Log	34
12.4	Daily Safety Meetings (“Tailgate Talks”)	35
12.5	Exposure Records	35
12.6	Incident Reports.....	35
12.7	OSHA Form 300.....	35
12.8	Hazard Communication Program/MSDS	35
13.0	FIELD PERSONNEL REVIEW	35

TABLE OF CONTENTS (Continued)

TABLES

Table 1	Contaminants of Concern
Table 2	Chemical Exposure Limits and Health Effects
Table 3	Hazard Analysis
Table 4	Instrumentation Action Levels
Table 5	Personal Protective Equipment

FIGURES

Figure 1	Site Location Map
Figure 2	Emergency Hospital Route Map

ATTACHMENTS

Attachment A	Health and Safety Briefing Statement
Attachment B	Field Procedures Change Authorization Form
Attachment C	Unsafe Conditions and Practices Form
Attachment D	Calibration Log
Attachment E	EMERGENCY NOTIFICATION NUMBERS
Attachment F	Accident/Incident Report Form
Attachment G	Material Safety Data Sheets (MSDS)

1.0 INTRODUCTION

1.1 Purpose and Policy

This Construction Health and Safety Plan (CHASP) has been developed to comply with the regulations under Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(b)(4), Hazardous Waste Operations and Emergency Response. It addresses foreseeable activities associated with the site work activities to be conducted at 390 and 400 Park Avenue South in Manhattan, New York (see Figure 1). This CHASP establishes personnel protection standards and mandatory safety practices and procedures. Additionally, it assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at known or suspected hazardous waste sites.

Langan personnel involved with inspection of site work activities which involve the displacement of soil and/or material or dewatering of excavations in the identified Area of Concern (AOC) during the proposed development shall comply with the requirements of this CHASP. All Langan personnel engaged in onsite activities will read this document carefully and complete the Safety Briefing Form (Attachment A), a copy of which will be provided to Langan's Project files. Contractors and subcontractors conducting construction-related activities which will disturb or displace soil in the identified AOC will provide their own HASP (equal or more stringent than the Langan CHASP) and are solely responsible for their own workers Health and Safety and providing a safe working environment in accordance with all applicable federal, state and local requirements. Each Subcontractor will have a designated Site Health and Safety Coordinator who will be responsible for ensuring that the designated procedures are implemented in the field. Personnel who have any questions or concerns regarding implementation of this plan are encouraged to request clarification from the Langan Project Manager. Field personnel must follow the designated health and safety procedures, be alert to the hazards associated with working close to vehicles and equipment, and use common sense and exercise reasonable caution at all times.

This CHASP covers construction related field activities which have the potential to disturb and/or displace contaminated fill material that was identified above the native material at the site. These activities include, but are not limited to excavation, moving and grading of the fill material that was identified to be between 7 to 14-feet in thickness from the current site grade.

This CHASP was prepared in accordance with the following documents and/or guidelines:

- Occupational Safety and Health Administration (OSHA) regulations for hazardous site workers (29 CFR 1910.120 and 29 CFR 1926); and,
- NIOSH/OSHA/USCG/USEPA *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*.

Langan's Health and Safety Program and Safe Operating Procedures support this site-specific CHASP.

The level of protection and the procedures specified in this CHASP represent the minimum health and safety requirements to be observed by site personnel engaged in the referenced inspection of construction related activities. Unknown conditions may exist, and known conditions may change. Should an employee find himself or herself in a potentially hazardous situation, the employee will immediately discontinue the hazardous procedures(s) and either personally effect appropriate preventative or corrective measures, or immediately notify the Site Supervisor or Project Manager of the nature of the hazard. In the event of an immediately dangerous or life threatening situation, the employee always has "stop work" authority. Any necessary revision to the Health and Safety procedures will be recorded in the Field Procedure Change Authorization Form (Attachment B), and will require authorization from the Langan Health and Safety Officer and Project Manager.

THE ULTIMATE RESPONSIBILITY FOR THE HEALTH AND SAFETY OF THE INDIVIDUAL EMPLOYEE RESTS WITH THE EMPLOYEE AND HIS OR HER COLLEAGUES. Each employee is responsible for exercising the utmost care and good judgment in protecting his or her own health and safety and that of fellow employees. Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the

observed condition to the attention of the appropriate health and safety personnel as designated above and to follow-up the verbal notification by completing the Unsafe Conditions and Practices Form provided in Attachment C, a copy of which will be provided to the Langan Health and Safety Officer.

"Extenuating" circumstances such as budget or time constraints, equipment breakdown, changing or unexpected conditions, never justify unsafe work practices or procedures. In fact, the opposite is true. Under stressful circumstances all project personnel must be mindful of the potential to consciously or unconsciously compromise health and safety standards, and be especially safety conscious. **ALL SITE PERSONNEL ARE EXPECTED TO CONSIDER "SAFETY FIRST" AT ALL TIMES.**

1.2 Site Descriptions

The subject property is located on 390 and 400 Park Avenue South between 28th and 27th Streets in the Gramercy neighborhood in Manhattan, New York. Soil disturbance and groundwater dewatering activities will be completed to allow for the construction of the proposed mixed use commercial/residential development. Work will be performed in accordance with the rules and regulations of the local governing bodies.

1.3 Scope of Work

The site work activities which will require the oversight by a Langan Engineer include the following scope and will include the completion of:

- Excavation and off-site disposal of soil generated during construction as part of the proposed building foundation;
- Completion of Foundation Construction Dewatering;
- Installation of a vapor barrier;

Details of the scopes of work to be completed in each of the work areas for this project are provided within the January 2012 Remedial Investigation Report and Remedial Action Work Plan.

The proposed site development consists of the construction of a forty-story mixed-use commercial/residential building. The building will contain one cellar level that will be built out to the property extents and one sub-cellar level that will occupy approximately 70% of the site. The bottom of cellar-slab elevation will be at approximately 17-feet below the existing sidewalk grade and the bottom of the sub-cellar slab will be at approximately 36-feet below existing sidewalk grade.

During construction, all soils excavated or disturbed at the site will be either transported off site for disposal at an approved facility or reused on the subject property. All soil generated for the previously delineated area of impacted soil (impacted historic fill material) will be excavated and disposed off-site at an approved off-site location. Personnel conducting activities that will contact the impacted historic fill shall abide to the provisions of this CHASP.

2.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

This section specifies the Langan Engineering and Environmental Services, Inc. (Langan) Project Organization.

2.1 Project Manager

Provides review of all site activities and directs site activities via the Site Safety Officer reports to Client. Has authority to direct response operations.

Responsibilities:

- Prepares and organizes the background review of site conditions, the RAP the site CHASP, and the field team.
- Obtains permission for site access and coordinates activities with appropriate officials.
- Ensures that the RAP is executed and on schedule.
- Briefs the field team on their specific assignments.
- Coordinates with the Site Safety Officer (SSO) to ensure that health and safety requirements are met.
- Prepares the final report and support files on the response activities.
- Serves as the liaison with public officials.

2.2 Health and Safety Coordinator (HSC)

Responsibilities:

- Assists SSO with development of the CHASP, updating CHASP as dictated by changing conditions, jobsite inspection results, etc.
- Assists SSO in conducting Jobsite Safety Inspections and assists with the correction of shortcomings found.
- Coordinates the activities of the Contract Medical Advisor staff in their CHASP responsibilities.
- Ensures training requirements are satisfied in a timely manner.
- Ensures medical evaluations of Langan personnel are current.
- Maintains all records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).
- Prepare any Root Cause Investigation Reports/Preventative Action Plans for any incidents and or Close Calls.

2.3 Site Safety Officer (SSO)

Advises the Project Manager and HSC on all aspects of health and safety on site. Stops work if any operation threatens worker or public health or safety.

Responsibilities:

- Manages field operations.
- Executes the RAP and schedule.
- Enforces safety procedures.
- Coordinates with the SSO in determining protection level.
- Enforces site control.
- Documents field activities and sample collection.
- Serves as a liaison with public officials.

- Ensures that all necessary Health and Safety equipment is available on site and is functional.
- Periodically inspects protective clothing and equipment.
- Conducts all on-site air monitoring activities and modifies PPE requirements based on action levels shown in Table 2.

- Ensures that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the Access Control points.
- Coordinates health and safety program activities with the HSC.
- Confirms each team member's suitability for work based on a physician's recommendation.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Implements all elements of this CHASP.
- Conducts periodic inspections to determine if this CHASP is being followed.
- Enforces the "buddy" system.
- Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.
- Sets up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on the site.
- Controls the decontamination of all equipment, personnel, and samples from the contaminated areas.
- Assures proper disposal of contaminated clothing and materials.
- Ensures that all required equipment is available.
- Advises medical personnel of potential exposures and consequences.
- Notifies emergency response personnel by telephone or radio in the event of an emergency.
- Assist in the preparation of all Root Cause Investigation Reports/ Preventative Action Plans for any incidents and or Close Calls.

3.0 HAZARDS ANALYSIS

This section presents all assessment of the general, chemical, physical and biological hazards that may be encountered during the tasks specified under this CHASP (Section 1.3). A detail on types of potential contaminants of concerns Langan anticipates to encounter at different locations during the intrusive investigation is listed in Tables 1 and 2 of this CHASP.

3.1 General Hazard Assessment

A general hazard assessment was conducted for the required field work described in Section 1.3 and the following potential hazards have been identified:

- Inhalation of volatile contaminants;
- Skin and eye contact with contaminants;
- Ingestion of contaminants;
- Inhalation of dusts impacted with semi-volatile, metals and PCB contaminants;
- Physical hazards associated with the use of heavy equipment;
- Excavation hazards;
- Tripping hazards;
- Noise exposure;
- Heat stress (depending on weather conditions);
- Cold exposure (depending on weather conditions);
- Flammable hazards;
- Electrical hazards; and,
- Use of personal protective equipment.

These hazards are further described in the task-by-task hazard analysis in Table 3. Specific chemical, physical and biological hazards are discussed below.

Mitigation and controls will include as needed work procedures, work/rest regiment, dust control measures, personal protective equipment, and respiratory protection as appropriate.

3.2 Chemical Exposure Hazards

The following chemical hazard evaluation for the proposed site development activities is based on the previous environmental investigation of the site. The evaluation has been conducted to identify chemicals/ materials that potentially may be present at the site, and to ensure that work activities, personnel protection, and emergency response are consistent with the specific contaminants that potentially could be encountered.

3.2.1 Specific Chemical Hazards Previously Detected at the Site

Impacted fill material has been identified on the subject property as identified in the January 2012 Remedial Investigation. In addition, impacted groundwater and soil vapor was identified on-site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2.

3.2.2 Chemical Hazard Exposure Routes

Potential hazards and their exposure routes include:

- Inhalation of organic vapors due to the presence of volatile organic compounds from diesel-powered equipment.
- Inadvertent ingestion of potentially toxic substances via hand to mouth contact or deliberate ingestion of materials inadvertently contaminated with potentially toxic materials. Included in this list are polycyclic aromatic hydrocarbons (PAHs), pesticides and metals.
- Dermal exposure and possible percutaneous (skin) absorption of certain lipophilic (readily absorbed through the skin) PAHs and pesticides.
- Skin and eye contact with contaminants at the site and decontamination activities.

Exposure limits and health effects of selected chemicals are in Table 2. The probability of exposure for each task is outlined in Table 3.

3.2.3 Control of Exposure to Chemical Hazards

To protect potentially exposed personnel the following procedures and protocols will be adopted and used as needed: work procedures will be adhered to, work zones will be established, dust control will be utilized, respirators (if required) and personal protective equipment will be worn, area air monitoring will be conducted during times of disturbance of the impacted fill material and strict personnel decontamination procedures will be followed. Disturbance of the native silt material located beneath the impacted historic fill material will not require adherence to identified Health and Safety monitoring and procedures.

3.3 Physical Hazards

3.3.1 Temperature Extremes

Hot Temperatures

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE, in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke. If onsite workers exhibit the signs of heat exhaustion or heat stroke, they should seek immediate medical attention.

Cold Temperatures

Workers may be exposed to the hazard of working in a cold environment. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, poor judgment, and unauthorized procedural changes. In order to prevent frostbite, hypothermia, trench foot and immersion foot, the workers are responsible for dressing warmly in layers with thick socks, gloves, and appropriate head and face gear. Upon the onset of discomfort due to the cold, onsite workers should take regular five to ten minute breaks to warm up inside nearby buildings and to drink warm fluids. Please note that the NYCDEP statute prohibits idling an engine for more than three minutes (one-minute if adjacent to a school). This statute includes the use of a vehicle for the purpose of warming up employees. As such, all contractors and employees shall identify a place to warm up in advance. If discomfort continues and the onsite workers start to

exhibit the signs of frostbite, hypothermia, trench foot or immersion foot, they should seek immediate medical attention.

3.3.2 Noise and Air Resources

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Hearing protection is required and shall be used in designated areas of the site as indicated by the posted signs. Workers with 8-hour time weighted average (TWA) exposures exceeding 85 dBA will be included in a Hearing Conservation Program (HCP). Based on the required scope of work, a HCP is not anticipated to be required.

The New York City Department of Environmental Protection (NYCDEP) has initiated construction noise rules effective 1 July 2007. Contractors employing construction equipment such as vacuum excavators, drill rigs, and jackhammers, are required by the rules to have notarized Construction Noise Mitigation Plans. Noise mitigation measures may include mufflers, etc. Construction activities will occur during hours that minimize noise disturbance to the community. In addition, no vehicles will idle for more than three minutes (one-minute adjacent to a school) when not in use for powering a tool.

Additionally, for any work that will be performed between 6:00 PM and 7:00 AM local time from Monday through Friday, including holidays, an after-hours noise permit is required and may be included as a stipulation on any NYCDOT or NYCDOB permits associated with work on this project. If the NYCDOT/NYCDOB are not associated with this project, an Alternate Noise Mitigation Plan is to be prepared and submitted to the NYCDEP for their review/approval and returned to the Contractor for posting on the site prior to commencement of field activities.

3.3.3 Hand and Power Tools

In order to complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Proper personal protective equipment shall be worn while utilizing hand

and power tools. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools.

3.3.4 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to equipment, piping, slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Potential adverse health effects include falling to the ground and becoming injured or twisting an ankle. Good housekeeping at the site must be maintained at all times.

3.3.5 Fire and Explosion

Prior to starting all excavation work, a review of appropriate New York City maps will be conducted to identify potential hazards. The possibility of encountering fire and explosion hazards exists from under- ground utilities and gases. Therefore, all excavation equipment must be grounded.

3.3.6 Material Handling

Manual lifting of heavy objects may be required. Failure to follow proper lifting techniques can result in back injuries and strains. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

Whenever possible, heavy objects must be lifted and moved by mechanical devices rather than by manual effort. The mechanical devices will be appropriate for the lifting or moving task and will be operated only by trained and authorized personnel. Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects, such as a Master Rigger or equivalent. Lifting devices, including equipment, slings, ropes, chains, and straps, will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.

The wheels of any trucks being loaded or unloaded, and/or parked on an incline, will be chocked to prevent movement. If applicable, outriggers will be extended on a flat, firm surface during operation. The lift and swing path of a crane/equipment will be watched and maintained clear of obstructions. Personnel will not pass under a raised load, nor will a suspended load be left unattended. Personnel will not be carried on lifting equipment, unless it is specifically designed to carry passengers.

All reciprocating, rotating, or other moving parts will be guarded at all times. Accessible fire extinguishers will be made available in all mechanical lifting devices. All material must be stored in tiers, racked, blocked, or otherwise secure to prevent sliding, falling, or collapse. All loads/material will be verified to be secure before transportation.

3.3.1 Confined Space/Excavation Hazards

Personnel entry into trenches or unshored (*e.g.*, lagging) excavations within the designated areas of concern will not be permitted. No other confined spaces are known to exist on Site. If entry into trenches or excavations is required, all work will stop until the CHASP has been revised to address the new hazards.

3.3.2 Working Near Equipment

Personnel working in the immediate vicinity of heavy equipment (*e.g.*, excavators, loaders, etc.) may encounter physical hazards resulting from contact with equipment. Field personnel should be aware of the presence of these hazards at all times and take appropriate action to avoid them. Due to the limited ability to communicate when wearing respiratory protection, the risk is increased. Workers must be careful to communicate with heavy equipment operators regarding their location, and should maintain a safe distance from operating equipment at all times. Prior to working around equipment, the site personnel will review appropriate hand signals with the operator.

Equipment will be equipped with back up alarms.

3.3.3 Electrical Safety

Although not anticipated, personnel may utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools.

3.3.4 Utilities

Prior to the start of any intrusive work, the location of above-ground and underground utilities and other structures will be completed by the contractor/subcontractor responsible for completing construction activities.

3.3.5 Vehicular Traffic

Portions of site activities (load in and load out) will be conducted in the street so vehicular and pedestrian traffic will be present. Appropriate precautions to protect the on-site workers and civilians should be used including the use of cones and traffic vests as appropriate.

3.4 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals and insects. As the potential for exposure to blood born pathogens during site investigation is anticipated to be low, a Blood Born Pathogen Exposure Plan (BBPEP) is not required. A BBPEP will be prepared if site operation requires its implementation.

3.4.1 Animals

During site operations, animals such as dogs, cats, pigeons, mice, and rats may be encountered. Workers shall use discretion and avoid all contact with animals. Bites and scratches from dogs and cats can be painful and if the animal is rabid, the potential for contracting rabies exists. Contact with rat and mice droppings may lead to contracting hantavirus. Inhalation of dried pigeon droppings may lead to psittacosis. Cryptococcosis and histoplasmosis are also diseases associated with

exposure to dried bird droppings but these are less likely to occur in this occupational setting.

3.4.2 Insects

Insects, including bees, wasps, hornets, mosquitoes, spiders, and ticks may be present at the site. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. In addition, mosquito bites may lead to St. Louis encephalitis or West Nile encephalitis.

3.4.3 Wound Care

A source of occupational exposure may occur when an employee gives First Aid and or CPR to an individual who had infectious blood. The occupational exposure occurs when there is the possibility for an employee's eyes, mucous membranes, non-intact skin (i.e., cut and abraded skin) to come into contact with potentially infectious materials from another employee. If an accident were to occur where First Aid would need to be administered, the person administering the First Aid will presume that any wounds and materials used are contaminated with BBP and should wear the appropriate PPE to prevent contact with these materials. Additionally, should the use of First Aid materials and or clothing that was potentially contaminated with BBP be encountered these materials should be properly containerized and transported to the nearest hospital for proper disposal.

3.5 Task Hazard Analysis

The tasks to be completed during the proposed site work activities, as summarized in Section 1.3, are listed in Table 3 with a Hazard Analysis for each task.

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 Levels of Protection

PPE must protect workers from the specific hazards they are likely to encounter on site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Based on anticipated site conditions and the proposed work activities to be performed at the 390 and 400 Park Avenue Site, Level D Protection will be used. The upgrading/downgrading of these levels of protection will be based on continuous air monitoring results as described in Section 5.0. The decision to modify standard PPE will be made by the SSO after conferring with the Project Manager. The levels of protection are described below.

- **Level D Protection**

- a. Safety glasses w/ sideshields or chemical splash goggles
- b. Safety boots/shoes (toe-protected)
- c. Hard hat
- d. Long sleeve work shirt and work pants
- e. Nitrile gloves
- f. Hearing protection (as needed)
- g. Reflective traffic vest

- **Level D Protection (Modified)**

- a. Safety glasses w/ sideshields or chemical splash goggles
- b. Safety boots/shoes (toe-protected)
- c. Disposable chemical-resistant boot covers
- d. Coveralls (polycoated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
- e. Hard hat
- f. Long sleeve work shirt and work pants
- g. Nitrile gloves
- h. Hearing protection (as needed)
- i. Reflective traffic vest

- **Level C Protection**

- a. Full face-piece, air-purifying, cartridge*-equipped, NIOSH-approved respirator [*combo cartridge P100/OV/CL/HC/SD/CD/HS (escape)]
- b. Inner (latex) and outer (nitrile) chemical-resistant glove
- c. Chemical-resistant safety boots/shoes (toe-protected)
- d. Disposable chemical-resistant boot covers
- e. Hard hat
- f. Long sleeve work shirt and work pants
- g. Coveralls (Tyvek or equivalent, poly-coated Tyvek will be worn when contact, or anticipated contact with wet contaminated soils, ground water, and/or non-aqueous phase liquids (NAPL) is anticipated)
- h. Hearing protection (as needed)
- i. Reflective traffic vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C, Level B, or Level A are summarized in Table 2. The written Respiratory Protection Program is maintained by the HSC in Langan's Doylestown, Pennsylvania office. The monitoring procedures and equipment are outlined in Section 5.0.

4.2 Respirator Fit-Test

All Langan employees and subcontractors performing site work who could be exposed to hazardous substances at the work site are in possession of a full face-piece, air-purifying respirator and have been successfully quantitative fit-tested within the past year. Quantitative fit-test records are maintained by the HSC.

4.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short the time period was the previous day they were used.

5.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

5.1 Monitoring During Site Operations

Atmospheric air monitoring results are used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments there are Site-specific action level criteria which are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the Site Safety Officer may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of impacted fill material, real time air monitoring will be conducted for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). A photoionization detector (PID) and/or flame ionization detector (FID) will be used to monitor concentrations of VOCs at personnel breathing-zone height. Dust monitoring will be accomplished with an aerosol monitor. Air monitoring will be the responsibility of the Site Safety Officer or designee. Air monitoring will be conducted approximately every 30 minutes during ground intrusive activities in the AOC on the project site. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal or more stringent as the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

5.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (11.7v) or equivalent will occur during intrusive work in the AOCs. Colormetric Indicator Tubes for benzene may be used as backup for the PID, if measurements remain above background monitor every 2 hours. The Field Supervisor will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, appearance of drill cuttings, etc.) since the last measurement. Instrument action levels for monitored gases are provided in Table 4.

5.1.2 SVOCs, PCBs, Pesticides, and Metals

Based upon the site historical fill, there is a potential for the soils to contain PAHs, PCBs, pesticides and metals. During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real time airborne dust monitor such as a Mini-Ram should be used to monitor for air particulates. The Field Supervisor will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. Instrument action levels for dust monitoring are provided in Table 4.

5.2 Noise Monitoring

As a standard work practice, hearing protection will be worn within the area that exceeds 85 dBA created by any loud machinery as a precaution. Hearing protection is required and should be used in designated areas of the site as indicated by the posted signs. If there is a reasonable possibility that workers may be exposed to an 8-hour time-weighted average exceeding 85 dBA specifically as a result of conducting the required tasks, noise monitoring will be conducted using a sound level meter. Work areas or tasks which pose an exposure risk greater than 85 dBA will require hearing protection.

The New York City Department of Environmental Protection (NYCDEP) has initiated construction noise rules effective 1 July 2007. Contractors employing construction equipment such as vacuum excavators, drill rigs, and jackhammers, are required by the rules to have noise mitigation plans. These plans will be available on site. Noise mitigation measures may include mufflers, etc. Boring activities will occur during daytime hours only to minimize noise disturbance to the community. In addition, no vehicles will idle for more than three minutes when not in use.

5.3 Monitoring Equipment Calibration and Maintenance

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments shall be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

All instruments shall be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on site by the SSO/Site Supervisor for reference.

5.4 Determination of Background Levels

Background (BKD) levels for VOCs and dust will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the Site Safety Officer.

Table 4 lists the instrument action levels.

6.0 COMMUNITY HEALTH AND SAFETY CONSIDERATIONS

The potential impact of site work activities on the surrounding community (residential and business) is of concern. Precautions taken to reduce or prevent contamination from leaving the work areas include the following:

- All appropriate equipment will be decontaminated before leaving the Site;
- AOC zone air monitoring will be conducted by Langan;
- Dust and vapor suppression techniques will be used as necessary;
- Downwind air monitoring for volatile organic compounds and dust will be done at the areas of concern perimeter every 30 minutes whenever site personnel are required to wear Level C respiratory protection as per this CHASP; and,
- Work will be suspended at any time that contaminants are found to be migrating off-site at a concentration that exceeds the most stringent compound-specific action level as per this CHASP and the Community Air Monitoring Plan (CAMP).

7.0 WORK ZONES AND DECONTAMINATION

7.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the SSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means. The Site Safety Officer may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the Site Safety Officer allowing adequate space for the activity to be completed, field members and emergency equipment.

7.2 Contamination Control

7.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

7.2.2 Minimization of Contact with Contaminants

During completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination as PPE is intended to minimize accidental contact. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

7.2.3 Personnel Decontamination Sequence

Decontamination will be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes shall be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, tools and Investigative Derived Waste (i.e., soil cutting) are provided below.

7.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment.

If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions shall be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent data.

7.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to removed any potentially contaminated soil, and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

7.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the SSO or his designee.

7.3 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the SSO for communication with the HSC and emergency support services/facilities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

<u>Signal</u>	<u>Meaning</u>
Hand gripping throat	Out of air, can't breathe
Grip on partner's wrist or placement of both hands around partner's waist	Leave area immediately, no debate
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand
Thumbs down	No, negative

8.0 MEDICAL SURVEILLANCE

All contractor and subcontractor personnel performing site field work where potential exposure to contaminants exists are required to have passed a complete medical surveillance physical examination in accordance with 29 CFR 1910.120(f).

9.0 MEDICAL SURVEILLANCE PROGRAM REQUIREMENTS

A physician's medical clearance for work will be confirmed by the SSO before an employee can work in the EZ. The examination will be completed annually at a minimum. Additional medical testing may be required by the HSC if, a.) an over-exposure or accident occurs, b.) an employee exhibits symptoms of exposure, or c.) other site conditions warrant further medical surveillance.

10.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911 the Langan Incident/Injury Hotline (201.398.4699) should be called as soon as possible.

10.1 Responsibilities

10.1.1 Health and Safety Coordinator (HSC)

The HSC oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSC will be notified of all incidents, injuries, near misses, OSHA recordable incidents, fires, spills, releases or equipment damage. The HSC acts as a liaison to applicable regulatory agencies.

10.1.2 Site Safety Officer (SSO)

The SSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The SSO is responsible for ensuring the HSC are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The SSO is required to immediately notify the HSC of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSC can notify OSHA within the required time frame.

10.1.3 Emergency Coordinator

The Emergency Coordinator is normally the SSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts,

the Emergency Coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The Emergency Coordinator shall locate emergency phone numbers and identify hospital routes prior *to beginning* work on the sites. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator shall implement the Emergency Response/Contingency Plan whenever conditions resulting from the Site Investigation warrant such action.

10.1.4 Site Personnel

Project site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors will be trained in the Emergency Response/Contingency Plan.

10.2 Communications

Once an emergency situation has been stabilized or as soon as practically possible, the SSO will contact the Langan Incident/Injury Hotline (201.398.4699) and Project Manager of identify any emergency situation.

10.3 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, Attachment E will be available in the field vehicles and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Due to traffic congestion that is prevalent in the New York metropolitan area, alternate hospital routes will need to be considered. The Emergency Coordinator will determine the appropriate route

based on time of day and traffic patterns. Changes in the referenced primary facilities shall be documented with the CHASP Field Change Authorization Request Form (Attachment B).

The Emergency Phone Numbers listed are preliminary. Upon mobilization, the SSO shall verify all numbers and document the changes in the Site Logbook. Any changes shall also be documented with the CHASP Field Change Authorization Request Form.

Hospital route maps will be provided to all field personnel.

10.4 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

10.5 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the SSO on site immediately. First-aid equipment will be available on site at the following locations:

First Aid Kit:	Vehicles
Emergency Eye Wash:	Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

Personnel with current first aid and CPR certification will be identified.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance.

Nearest hospital: **Bellevue Hospital Center**
462 1st Avenue
New York, NY 10016
(212) 562-4141

(directions from site to hospital found on Figure 2)

10.6 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site investigation activities, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

10.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

10.7.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.

- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the SSO.

10.8 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel shall evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations shall be monitored for volatile organics..
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator shall notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

10.9 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin shall also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs. Affected items of clothing shall also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or sub contractor on-site.

10.10 Decontamination During Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

10.11 Incident Reporting

Once first aid and/or emergency response needs have been met, the following parties are to be contacted:

- Langan Incident/Injury Report Hotline (201)398-4699
- Langan Project Manager, Chris McMahon (201)218.2339 or Steve Ciambuschini (201-794-6900)
- Langan Health and Safety Manager, Tony Moffa (215-491-6500)
- The employer of any injured worker who is not a Langan employee

For emergencies involving personal injury and/or exposure including near-misses, the SSO or designee will complete and submit an Incident Report form (Attachment F) within 48 hours. If the employee involved is not a Langan employee, his employer shall receive a copy of the report.

10.12 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The SSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

10.13 Spill Control and Response

All small spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles shall have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment shall be inspected prior to be admitted on site. Any vehicle or piece

of equipment that develops a leak will be taken out of service and removed from the job site.

All subcontractor employees as well as Langan employees will be 40-hour HAZWOPER trained.

The following seven steps shall be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the SSO immediately.
4. Use proper PPE in consultation with the SSO.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan shall not make any notification of spills to outside agencies. The client will notify regulatory agencies as per their reporting procedures.

10.14 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).
- Absorbent material.

10.15 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

11.0 TRAINING

11.1 General Health and Safety Training

With Langan corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not satisfied the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

11.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for site work. The training will cover a review of 1910.120 requirements and related company programs and procedures. The SSO will be required to have the eight-hour HAZWOPER supervisor training.

11.3 Site-Specific Training

Prior to commencement of site activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include a documented verbal review of the entire CHASP and all the provisions within the CHASP document. Should any new employees arrive on-site, they will also be given a documented full CHASP review – or one that address the appropriate tasks that remain at the time of the new employee’s arrival.

11.4 Onsite Safety Briefings

Project personnel and visitors will participate in documented daily on-site health and safety briefings (“Tailgate Talks”) led by the SSO to assist site personnel in safely conducting their work activities. The briefings will include information on operations to be conducted that shift, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity for the work crews to be updated on monitoring results. Prior to starting any new activity, a training session will be held for crew members involved in the activity. The Safety Briefing form (Attachment A) can be used to facilitate this effort.

11.5 First Aid and CPR

The SSO will identify those individuals with first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The

training will be consistent with the requirements of the American Red Cross or the National Safety Council.

11.6 Hazard Communication

All material brought on-site will be in the appropriate containers and will be properly labeled. The MSDS for unleaded gasoline, diesel fuel, and hydraulic fluid are attached. Langan's written Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained in Langan's office in Elmwood Park, New Jersey.

12.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

12.1 Field Change Authorization Request

A field change authorization request is to be completed for requesting a change to this CHASP (Attachment B). Any changes to the work to be performed that is not included in the CHASP will require an Addendum that is approved by the Langan Project Manager and Langan HSC to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

12.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day OJT, and respirator fit-test records) and medical clearance for Site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSC.

12.3 Onsite Log

A log of personnel on site each day will be kept by the Site Supervisor or designee.

12.4 Daily Safety Meetings (“Tailgate Talks”)

Completed Safety Briefing forms will be maintained by the SSO.

12.5 Exposure Records

All personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the SSO during site work. At the end of the project they will be maintained according to 29 CFR 1910.1020.

12.6 Incident Reports

The incident reporting and investigation during site work will follow the procedures specified here in.

12.7 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Office in Doylestown, Pennsylvania. All recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses.

12.8 Hazard Communication Program/MSDS

Material Safety Data Sheets (MSDS) have been obtained for applicable substances and are included in this CHASP (Attachment G). Langan’s written Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSC in Elmwood Park, New Jersey.

13.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have been verbally given a full CHASP review by Langan personnel, and understand the provisions of this EHS Plan. It is maintained on site by the SSO as a project record.

Each field team member shall sign this section after Site-specific training is completed and before being permitted to work onsite.

<i>Name (Print and Sign)</i>	<i>Company</i>	<i>Date</i>

TABLES

TABLE 1
CONTAMINANTS OF CONCERN
390 and 400 Park Avenue South
NEW YORK, NEW YORK

Contaminant Of Concern	Affected Media
VOLATILES	
Total Volatiles ¹	Soil/Groundwater/Soil Vapor
1,2-dichloroethane (cis)	Soil/Groundwater
Tetrachloroethene	Soil/Groundwater/Soil Vapor
m&p Xylenes	Soil/Soil Vapor
o-Xylenes	Soil/Soil Vapor
Chloroform	Soil Vapor/Groundwater
Toluene	Soil/Soil Vapor
Acetone	Groundwater
Trichloroethene	Groundwater
SEMI-VOLATILES	
Benzo(a)anthracene	Soil
Benzo(b)flouranthene	Soil
Benzo(k)flouranthene	Soil
Benzo(a)pyrene	Soil
Chrysene	Soil
Dibenzo(a,h)anthracene	Soil
Indeno (1,2,3-cd) pyrene	Soil
Flouranthene	Soil
Pyrene	Soil
PESTICIDES	
4,4'-DDD (p,p')	Soil
4,4'-DDE (p,p')	Soil
4,4'-DDT (p,p')	Soil
Chlordane	Soil
METALS	
Iron	Groundwater
Barium	Soil
Cadmium	Soil
Copper	Soil
Lead	Soil/Groundwater
Manganese	Groundwater
Mercury	Soil
Nickel	Soil
Selenium	Groundwater
Sodium	Groundwater
Zinc	Soil

1: No volatile organic compounds (VOCs) were found onsite in concentrations above applicable health-based soil remediation criteria and therefore pose a minimum risk individually. These contaminants are mentioned here however as they collectively may be responsible for objectionable odors during excavation.

TABLE 2
SELECTED CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Total Volatile Organics	15 ppm	150 ppm	Inhalation, Skin Absorption, Ingestion	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Tetrachloroethene	15 ppm	150 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Nausea, vomiting, abdominal pain, tremor fingers, jaundice, hepatitis, liver tenderness, dermatitis, monocytosis, kidney damage [potential occupational carcinogen]
Chloroform	50 ppm	500 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, skin, dizziness mental dullness, confusion, lightness of head nausea, fatigue, anorexia, enlarged liver; [carcinogenic]
Acetone	1000 ppm	2500 ppm	Inhalation, Ingestion, skin and/or eye contact	Irritate eyes, nose, throat, headache, dizziness, central nervous system depression, dermatitis.
Xylenes	100 ppm	900 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corn vacuolization; anorexia, nausea, vomit, abdominal pain; dermatitis
Trichloroethene	100 ppm	1,000 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational

TABLE 2
SELECTED CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
				carcinogen]
1,2-Dichloroethylene	200 ppm	1,000 ppm	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression
Toluene	200 ppm	500 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage; mucous membrane; narcosis, coma
Benzo(a)anthracene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(b)fluoranthene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(k)fluoranthene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(a)pyrene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Chrysene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Dibenzo(a,h)anthracene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Flouranthene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Indeno (1,2,3-cd) pyrene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Pyrene	0.2 mg/m ³	80 mg/m ³	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
4,4'-DDD (p,p')	1 mg/m ³	500 mg/m ³	Inhalation, Skin	Irritation eyes, skin; paresthesia

TABLE 2
SELECTED CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
			Absorption, Ingestion, skin and/or eye contact	tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
4,4'-DDE (p,p')	1 mg/m ³	500 mg/m ³	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
4,4'-DDT (p,p')	1 mg/m ³	500 mg/m ³	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]
Chlordane	0.25 mg/m ³	50 mg/m ³	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney

TABLE 2
SELECTED CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
				damage
Barium	0.5 mg/m ³	50mg/m ³	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, skin, upper respiratory system; skin burns, gastroenteritis, muscle spasm; slow pulse, extrasystoles; hypokalemia
Cadmium	0.005 mg/m ³	9 mg/m ³	Inhalation, Ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substantial pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, anosmia, emphysema, proteinuria, mild anemia [Carcinogen]
Copper	1 mg/m ³	100 mg/m ³	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]
Lead	1 mg/m ³	100 mg/m ³	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]
Mercury	0.1 mg/m ³	10 mg/m ³	Inhalation, Ingestion, skin and/or eye contact, skin absorption	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

TABLE 2
SELECTED CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Nickel	10 mg/m ³	0.1 mg/m ³	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Zinc	1 mg/m ³	10 mg/m ³	Inhalation, Ingestion	Sensitization dermatitis, allergic asthma, pneumonitis; (potential occupational carcinogen)

--- No exposure limits listed in the NIOSH Pocket Guide to Chemical Hazards dated September 2005.

**TABLE 3
HAZARD ANALYSIS
390 and 400 PARK AVENUE SOUTH
NEW YORK, NEW YORK**

Potential Hazard	Earthwork	Dewatering Excavations	Equipment Decontamination
Inhalation of volatiles	moderate	low	low to moderate
Skin and eye contact	moderate to high	moderate	moderate to high
Ingestion	moderate	Low to moderate	Low to moderate
Inhalation of dust	moderate to high	low	low to moderate
Heat stress	depends on temperature	depends on temperature	depends on temperature
Cold stress	depends on temperature	depends on temperature	depends on temperature
Confined Space Entry	moderate to high	low to moderate	not applicable
Heavy equipment	moderate to high	low	low to moderate
Noise	moderate	moderate	moderate
Tripping	moderate	moderate	moderate
PPE	moderate to high	low	moderate
Utilities	moderate	low	low
Other Physical hazards	moderate to high	low	moderate
Biological hazards	low	low	low
Flammable hazards	low	low	low

\\langan.com\data\EP\data6\100271601\Engineering Data\Environmental\Reports\NYCBCP RAWP - 2012-02\CHASP\HASP TABLE 3.doc

TABLE 4
INSTRUMENTATION ACTION LEVELS
390 and 400 PARK AVENUE SOUTH
New York, New York

Instrument	Action Level	Level of Protection / Action Required
PID*/FID*	< 15 ppm within AOC zone	Level D
	> 15 ppm (initial)	Stop work. Resume work once readings are below 15 ppm.
	> 15 ppm and \leq 30 ppm (steady state condition) within breathing zone	Level C/Initiate Perimeter Monitoring
	> 30 ppm (steady state condition) within AOC zone	Stop Work / Suppress Emissions / Evacuate and re-evaluate.
	\geq 5 ppm above background for the 15-minute average at downwind perimeter.	Stop Work/ Re-evaluate.
	\leq 5ppm and \geq 25 ppm downwind perimeter of AOC Zone	Stop Work / Take corrective actions to abate emmissions. Resume work if >5 ppm
	<25 ppm at perimeter of work area	Stop work.

Total Dust Aerosol Monitor	> 0.100 mg/m ³ above BKD (steady state condition) at perimeter of AOC zone for 15-minutes or visible dust.	Stop Work / Implement dust control / Continue dust monitoring if dust levels are less than 150 mg/m ³
	< 0.150 mg/m ³ above BKD (following dust suppression measures)	Stop Work / implement dust control, continue work once levels are <150 mg/m ³

BKD = Background concentration

*PID/FID readings are taken at personnel breathing zone height using a 10.2V lamp PID or equivalent.

TABLE 5
PERSONAL PROTECTIVE EQUIPMENT
390 and 400 PARK AVENUE SOUTH
New York, New York

Respiratory Protection:

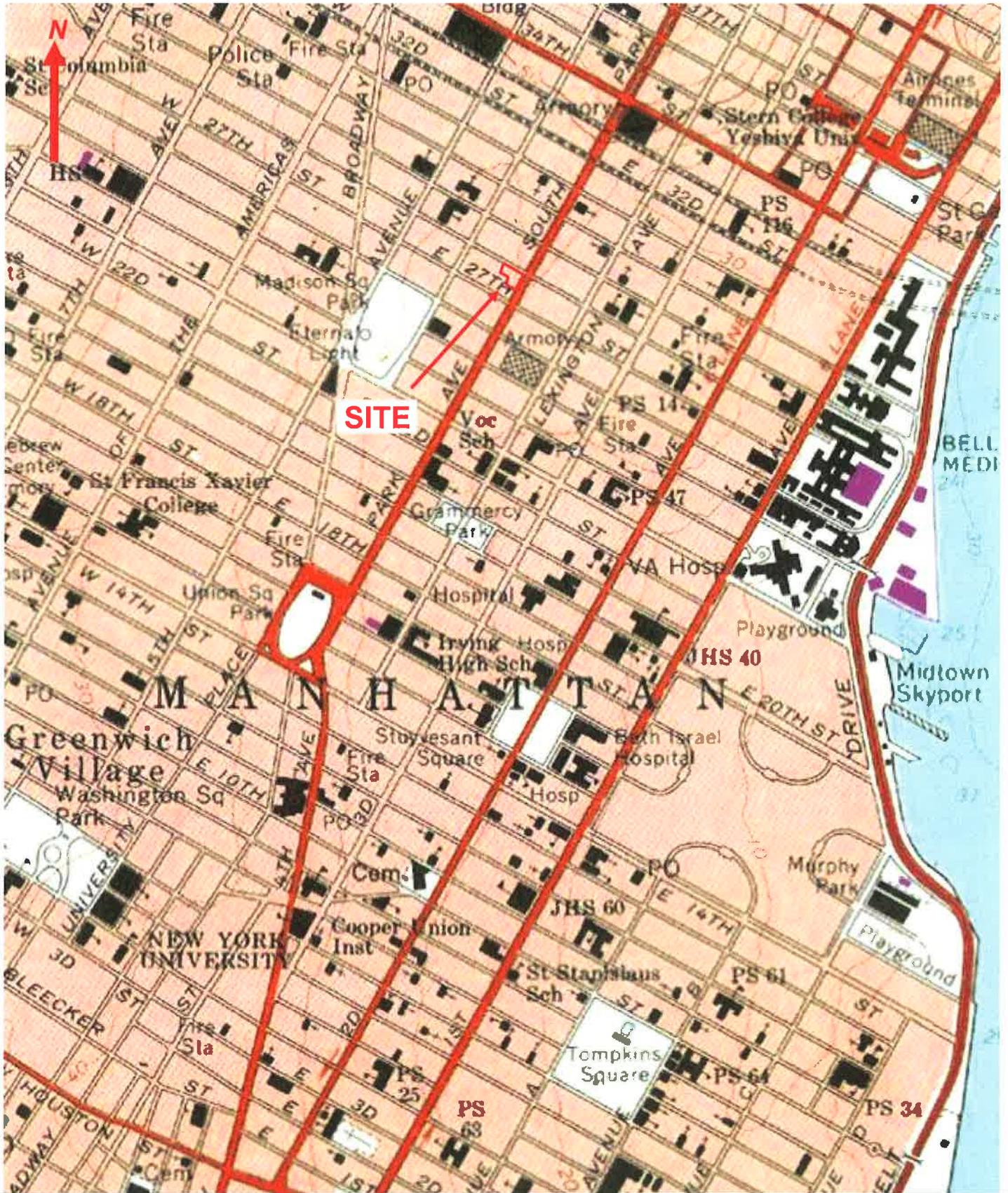
Level D:	No respirator required.
Level C:	Half-face, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor cartridges. The respirator will be NIOSH-approved.
Level C - supplemental by task	Fullface, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols), acid gas, organic vapor cartridges. The respirator will be NIOSH-approved.

Personal Protective Clothing:

Level D:	Hard-hat, traffic vest (if working on or adjacent to the roadway), long sleeve work shirt & work pants of natural fibers, safety glasses or goggles, steel-toed boots, hearing protection (if needed), nitril inner gloves and leather outer gloves.
Level D - supplemental PPE by task	Tyvek disposal suit
Level C:	Chemically resistant outer boots and Chemical resistant Tyvek disposal suite.

\\LANGAN.COM\DATA\EP\DATA6\100271601\ENGINEERING DATA\ENVIRONMENTAL\REPORTS\NYCBCP RAWP - 2012-02\CHASP\HASP TABLE 5.DOC

FIGURES



Project

**400 PARK AVENUE SOUTH
SITE LOCATION MAP**

NEW YORK

NEW YORK

JOB NO.
1956001

DATE
8/11/2011

SCALE
NTS

FIGURE NO.
1

ELMWOOD PK, NJ
(201) 794-6900

NEW YORK, NY
(212) 964-7888

PHILADELPHIA, PA
(215) 864-0640

DOYLESTOWN, PA
(215) 348-7101

NEW HAVEN, CT
(203) 562-5771

MIAMI, FL
(305) 362-1166



A 44 E 28TH St, New York, NY 10016

B 462 1st Ave # A, New York, NY
Bellevue Hospital (212) 263-7300

Route: 0.7 mi, 4 min

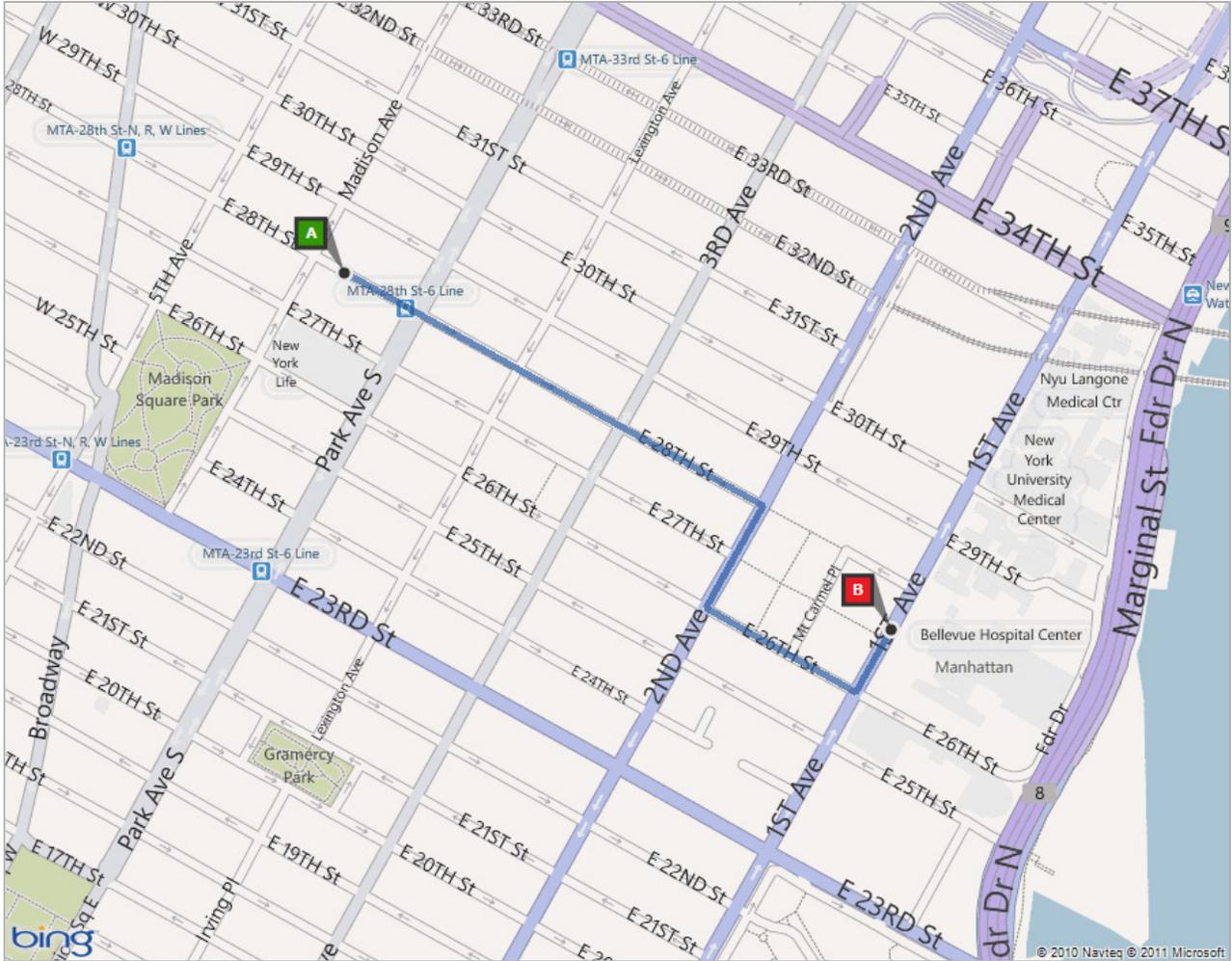
My Notes

 On the go? Use **m.bing.com** to find maps, directions, businesses, and more

A	44 E 28TH St, New York, NY 10016	A-B: 0.7 mi 4 min
	1. Depart E 28TH St toward Park Ave S	0.4 mi
	2. Turn right onto 2ND Ave	518 ft
	3. Turn left onto E 26TH St	0.1 mi
	4. Turn left onto 1ST Ave	315 ft
B	5. Arrive at 462 1st Ave # A, New York, NY <i>The last intersection is E 26TH St</i> <i>If you reach E 28TH St, you've gone too far</i>	

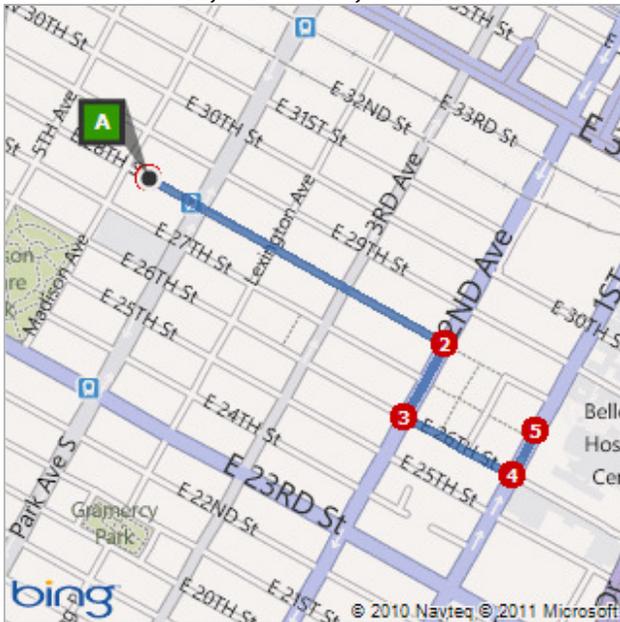
These directions are subject to the Microsoft®: Service Agreement and for informational purposes only. No guarantee is made regarding their completeness or accuracy. Construction projects, traffic, or other events may cause actual conditions to differ from these results. Map and traffic data © 2010 NAVTEQ™.

Route: 0.7 mi, 4 min

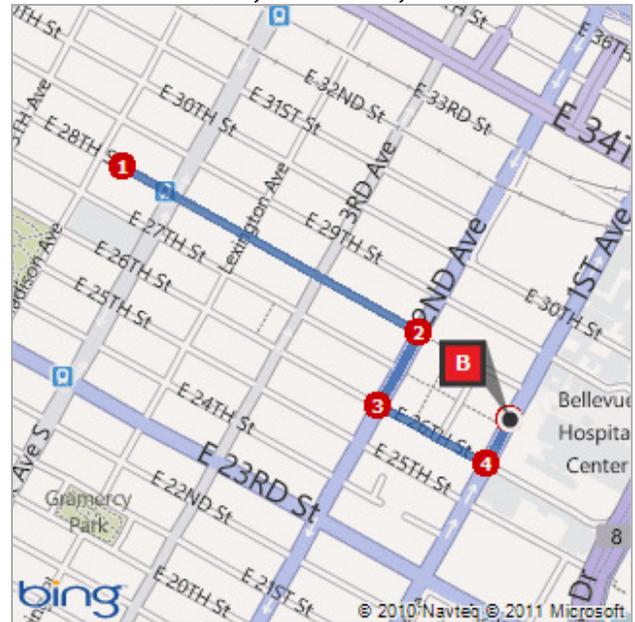


This was your map view in the browser window.

A: 44 E 28TH St, New York, NY 10016



B: 462 1st Ave # A, New York, NY



ATTACHMENT A

Health and Safety Briefing Statement

ATTACHMENT A

HEALTH AND SAFETY BRIEFING STATEMENT

The following personnel were present at a pre-job safety briefing conducted at _____(time) on _____ (date) at _____(location), and have read this Health and Safety Plan for the above Site and are familiar with its provisions:

Name	Signature
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

- Fully charged ABC class fire extinguisher available on Site? _____
- Fully stocked First Aid Kit available on Site? _____
- All project personnel advised of location of nearest phone? _____
- All project personnel advised of location of designated medical facility? _____

Name of Field Team Leader or Site Safety Officer

Signature

Date

ATTACHMENT B

Field Procedures Change Authorization Form

ATTACHMENT B

FIELD PROCEDURES CHANGE AUTHORIZATION FORM

Section to be changed: _____

Duration of Authorization Requested

Date: _____

_____ Today only

_____ Duration of Task

_____ Other _____

Description of Procedures Modification:

Justification:

Time

Title

Approvals:

ATTACHMENT C

Unsafe Conditions and Practices Form

ATTACHMENT C

UNSAFE CONDITIONS AND PRACTICES FORM

DESCRIPTION OF CIRCUMSTANCES REGARDING UNSAFE CONDITION OR PRACTICE:

IS THIS CONDITION EXISTING OR POTENTIAL? _____

REPORTED TO: _____

REPORTED BY: _____

DATE REPORTED: _____

COMMENTS: _____

ATTACHMENT D

Calibration Log

ATTACHMENT E

Emergency Notification Numbers

ATTACHMENT E
EMERGENCY NOTIFICATION NUMBERS

The following list provides names and telephone numbers for emergency contact personnel.

ORGANIZATION	CONTACT	TELEPHONE
New York City Police		911
New York City Fire		911
Jewish Home & Hospital		212-695-7830
Langan Incident/Injury Hotline		201-398-4699
Langan Project Manager	Chris McMahon	201-398-4535
National Response Center		800-424-8802
Center for Disease Control		404-488-4100
CHEMTREC		800-424-9300
TSCA HOTLINE		202-554-1404
RCRA HOTLINE		800-424-9346
CDC	(DAY) (NIGHT)	404-452-4100 404-329-2888
BUREAU OF ALCOHOL, TOBACCO & FIREARMS		800-424-9555 202-566-7777
NATIONAL RESPONSE CENTER		800-424-8802
PESTICIDE INFORMATION SERVICE		800-424-9346
BUREAU OF EXPLOSIVES, A.A. RAILWAYS		202-835-9500
FEDERAL EXPRESS - HAZARDOUS MATERIAL INFO		901-922-1666

ATTACHMENT F

Accident / Incident Report Form

ATTACHMENT F

INCIDENT REPORT

**LANGAN EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT
(Submit a Separate Report for Each Employee and/or Incident)**

Date: _____

Employee's Name: _____ Employee No: _____

Sex: M _____ F _____ Age: _____

Region: _____ Location: _____

Project: _____ Project No: _____

Incident: _____

Type: Possible Exposure _____ Exposure _____ Physical Injury _____

Location: _____

Date of Incident: _____ Time of Incident: _____

Date of Report Incident: _____

Person(s) to Whom Incident was Reported: _____

Weather Conditions During Incident: Temperature _____ Humidity _____

Wind Speed and Direction: _____ Cloud Cover: _____

Clear: _____ Precipitation: _____

Materials Potentially Encountered: _____

Chemical (give name of description - liquid, solid, gas, vapor, fume, mist):

Radiological: _____

Other: _____

Nature of the Exposure/Injury: (State the nature of the exposure/injury in detail and list the parts of the body affected. Attach extra sheets if necessary).

Did you receive medical care? Yes _____ No _____ If so, when _____

Where? On-Site _____ Off-Site _____

By Whom: Name of Paramedic: _____

Name of Physician: _____

Other: _____

If Off-Site, name facility (hospital, clinic, etc): _____

Length of stay at the facility? _____

Was the Site Safety Officer contacted? Yes _____ No _____ When? _____

Was the Corporate Health and Safety Officer contacted? Yes _____ No _____

If so, who was the contact? _____

Did the exposure/injury result in permanent disability? Yes _____ No _____

If so, explain: _____

Has the employee returned to work? Yes _____ No _____

List the names of other persons affected during this incident:

List the names of persons who witnessed the exposure/injury incident:

Possible cause of the exposure/injury incident: _____

What was the name and title of the field team leader or immediate supervisor at the site of the incident?

Was the operation being conducted under an established Health and Safety Plan?

Yes _____ No _____ If yes, attach a copy. If no, explain

Describe protective equipment and clothing used by the employee:

Did any limitations in safety equipment or protective clothing contribute to or affect exposure? If so, explain:

What was the employee doing when the exposure/injury occurred? (Describe briefly as Site Reconnaissance, Site Characterization, or Sampling, etc.):

Where exactly on site or off site did the exposure/injury occur?

How did the exposure/injury occur? (Describe fully what factors led up to and/or contributed to the incident):

Name of person(s) initiating report, job title, phone number:

Employee Signature

Date

Site Safety Officer Signature or Field Team Leader Signature

Date

ATTACHMENT G

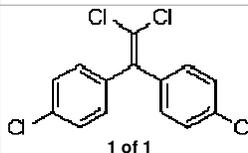
Material Safety Data Sheets (MSDS)

[LOGIN](#) [REGISTER](#) [CHANGE COUNTRY](#)

Search


[ORDER CENTER](#) [ADVANCED SEARCH](#)
[Ask A Scientist](#)
[Home->Site Search](#)

Product Image



Useful Links & Tools

[Bulk Quote-Order Product](#)
[MSDS](#)
[Specification Sheet](#)
[Certificate of Analysis](#)

 Enter Lot No.
[FT-IR Condensed Phase](#)
[FT-IR Raman](#)
[FT-NMR](#)
[Gene Information](#)
[More...](#)

Related Categories

- Organic Building Blocks > Alkenes > Acyclic
- Cell Biology > Bioactive Small Molecules > D-DIF

Last 5 Products Viewed

- 123897 (Aldrich)

123897 **1,1-Dichloro-2,2-bis(4-chlorophenyl)ethene**

Aldrich 99%


 Be the first to [write a review](#).

Price and Availability

Product Number	Availability	Your Price USD	Quantity	Actions
123897-1G	In Stock details... Ships on 05/13/11	39.00	<input type="text"/>	

Synonym:	4,4'-DDE
CAS Number:	72-55-9
Linear Formula:	(ClC ₆ H ₄) ₂ C=CCl ₂
Molecular Weight:	318.03
Beilstein Registry Number:	1913355
EC Number:	200-784-6
MDL number:	MFCD00000837
PubChem Substance ID:	24847587

Customers Also Viewed

<p>35487</p> <p>4,4'-DDE PESTANAL[®], analytical standard</p>	<p>386340</p> <p>4,4'-DDT 98%</p>	<p>B9061</p> <p>Bicalutamide (CDX) ≥98% (HPLC), powder</p>	<p>E6657</p> <p>Eplerenone ≥98% (HPLC)</p>
--	---------------------------------------	--	--

[Details](#)
[Related Products](#)
[References](#)
[Reviews](#)

Description

Biochem/physiol Actions	Metabolite of DDT. Potent androgen receptor antagonist, the presence of which has been associated with an increased risk of breast cancer development.
Packaging	1, 5 g in glass btl

Properties

assay	99%
mp	88-90 °C(lit.)

[Research your gene in Your Favorite Gene powered by Ingenuity](#)

Gene Information
 mouse ... [Esr1\(13982\)](#)
 rat ... [Ar\(24208\)](#)

Safety

Symbol	GHS07, GHS08, GHS09
Signal word	Warning
Hazard statements	H302-H351-H410
Precautionary statements	P273-P281-P501
Personal Protective Equipment	Eyeshields, full-face particle respirator type N100 (US), Gloves, respirator cartridge type N100 (US), type P1 (EN143) respirator filter, type P3 (EN 143) respirator cartridges
Hazard Codes	Xn,N
Risk Statements	22-40-50/53

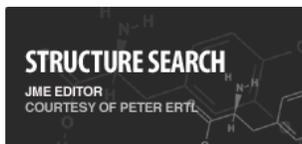
Safety Statements [36/37-60-61](#)
RIDADR UN 3077 9/PG 3
WGK Germany 3

YOUR FAVORITE GENE SEARCH

Enter Gene, Disease...



POWERED BY INGENUITY



General Help

[✉ EMAIL CUSTOMER SUPPORT](#)

SERVICE & SUPPORT

CUSTOMER SUPPORT
TECHNICAL SERVICE
WEB HELP DESK
MSDS
C OF A

ORDERING

CUSTOM PRODUCTS
ECOMMERCE SOLUTIONS
ORDER CENTER
PRODUCTS
TERMS & CONDITIONS

CORPORATE

INVESTOR RELATIONS
BUSINESS DEVELOPMENT
WORLDWIDE OFFICES
ABOUT US
SITE MAP
CAREERS
EVENTS
PROGRAMS
REACH REGULATIONS
CONTACT US
LITERATURE PORTAL
TOOL BOX

Copyrights © 2011 Sigma-Aldrich Co. All Rights Reserved. Reproduction of any materials from the site is strictly forbidden without permission. Sigma-Aldrich brand products are sold exclusively through Sigma-Aldrich, Inc. [Site Use Terms](#) | [Privacy](#)

4,4'-DDT

sc-238975



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

4,4'-DDT

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave

Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Insecticide for tobacco and cotton, pesticide (tussock moth). Intermediate

SYNONYMS

C14-H9-Cl5, "1, 1' -(2, 2, 2-trichloroethylidene) bis [4-chlorobenzene]", "1, 1' -(2, 2, 2-trichloroethylidene) bis [4-chlorobenzene]", "1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl)ethane", "1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl)ethane", "ethane, 1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl)", "ethane, 1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl)", "benzene, 1, 1' -(, 2, 2-trichloroethylidene)bis(4-chloro)-", "benzene, 1, 1' -(, 2, 2-trichloroethylidene)bis(4-chloro)-", "alpha, alpha-bis(p-chlorophenyl)-beta, beta, beta-trichloroethane", "1, 1-bis-(p-chlorophenyl)-2, 2, 2-trichloroethane", "1, 1-bis-(p-chlorophenyl)-2, 2, 2-trichloroethane", "2, 2-bis(p-chlorophenyl)-1, 1, 1-trichloroethane", "2, 2-bis(p-chlorophenyl)-1, 1, 1-trichloroethane", "p, p' -DDT", "p, p' -DDT", "diphenyl trichloroethane", "dichlorodiphenyltrichloroethane", "p, p-dichlorodiphenyltrichloroethane", "p, p-dichlorodiphenyltrichloroethane", "4, 4' -dichlorodiphenyltrichloroethane", "4, 4' -dichlorodiphenyltrichloroethane", Agritan, Anofex, Arkotine, Azotox, "Bosan supra", Bovidermal, Chlorophenothane, Chlorophenotoxum, Citox, Clofenotane, Dedelo, Deoval, Ditoxan, Dibovan, Dicophane, Didigam, Didimac, Dodat, Dykol, Estonate, Genitox, Gesafid, Gesapon, Gesarex, Gesarol, Guesapon, Guesarol, Gyron, Haverro-extra, Hildit, Ivoran, Ixodex, Kopsal, Mutoxin, Neocid, OMS-16, Parachlorodicum, Peb1, Pentachlorin, Zeidane, Zerdane, insecticide

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Limited evidence of a carcinogenic effect.

Toxic: danger of serious damage to health by prolonged exposure if swallowed.
Toxic in contact with skin and if swallowed.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
- Organochlorine pesticides excite the central nervous system, causing shortness of breath, cough, narrowing of airways and throat spasms. In the muscles it can cause twitches, spastic movements and seizures. Headache, dizziness and confusion may result as well as a feeling of warmth. Other symptoms include nausea, vomiting, diarrhea and difficulty in urination. There may be alterations in blood pressure or irregularities in heart rhythm. Delayed poisoning may occur after 30 minutes to several hours. Symptoms may include diarrhea, stomach pain, headache, dizziness, inco-ordination, "pins and needles", restlessness, irritability, confusion and tremors, progressing to stupor, coma and epilepsy-like or spastic seizures with frothing at the mouth, a contorted face, violent convulsions and limb stiffness. Tremors may spread from the face to the torso and limbs. Severe poisoning may cause continuous convulsion, fever, unconsciousness, labored breathing, rapid heartbeat and general depression; this is followed by lack of oxygen, collapse of breathing, and death. Kidney damage and inflammation and anemia has also been reported.
- Earliest symptom of exposure to DDT is a prickling or tingling sensation in the mouth, tongue and lower face. This is followed by dizziness, abdominal pain, headache, nausea, vomiting, diarrhoea, mental confusion, a sense of apprehension, weakness, loss of muscle control and tremors. Higher exposures can cause severe convulsions followed by death. Symptoms may occur within 30 minutes to 6 hours after exposure, depending upon the severity of the exposure. DDT and its analogues may cause gastrointestinal effects.

EYE

- Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

- Skin contact with the material may produce toxic effects; systemic effects may result following absorption.
- The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
- Inhalation of dusts, generated by the material during the course of normal handling, may be damaging to the health of the individual.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

- There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of: some evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.

The following chronic health effects can occur some time after exposure to DDT and can last for months or years. There is some evidence that it causes cancer in humans and it has been shown to cause liver cancer in animals.

DDT may damage the liver and kidneys, damage the developing fetus and decrease fertility in males and females, and cause central nervous system degeneration.

High doses of o,p'-DDT fed to immature female rats exert clear oestrogenic effects. Males fed 1 ppm o,p'-DDT from birth had significantly heavier bodies, testes and seminal vesicles at day 112. In a another study adult male rats treated with o,p'-DDT showed decreased corticosterone formed from progesterone in the adrenals and lowered unchanged progesterone. In brain metabolism, treatment with o,p'-DDT increased dihydrotestosterone from testosterone while androstenediol decreased. The authors concluded that the effects of o,p'-DDT administration are a decrease in plasma testosterone and in androgen biosynthesis, and an increase in plasma oestradiol.

Exposure to organochlorine pesticides for long periods can cause multiple nervous system infections and disorders involving the brain and autonomic nerves with headache, dizziness, "pins and needles", tremor in the limbs, disturbances in nerves supplying blood vessels, pain in the bowel and stiffening of the bile duct, rapid heartbeat, hollow heart sounds and a tight pain in the chest. There can be blood problems with loss of platelets and white blood cells, change in blood cell distribution, anemia, loss of appetite and weight. There may be disturbed behavior. Some organochlorines may have female sex hormone-like effects, causing withering of the testicles, reduced fertility and disturbed sexual activity.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

	Min	Max
Flammability:	1	

Toxicity:	3	
Body Contact:	3	
Reactivity:	1	
Chronic:	3	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



NAME	CAS RN	%
DDT	50-29-3	>99
(dichlorodiphenyltrichloroethane)		

Section 4 - FIRST AID MEASURES

SWALLOWED

- Give a slurry of activated charcoal in water to drink. NEVER GIVE AN UNCONSCIOUS PATIENT WATER TO DRINK.
- At least 3 tablespoons in a glass of water should be given.
- Although induction of vomiting may be recommended (IN CONSCIOUS PERSONS ONLY), such a first aid measure is dissuaded because to the risk of aspiration of stomach contents. (i) It is better to take the patient to a doctor who can decide on the necessity and method of emptying the stomach. (ii) Special circumstances may however exist; these include non-availability of charcoal and the ready availability of the doctor.

NOTE: If vomiting is induced, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. NOTE: Wear protective gloves when inducing vomiting.

- REFER FOR MEDICAL ATTENTION WITHOUT DELAY.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

(ICSC20305/20307).

EYE

- If this product comes in contact with the eyes:
 - Immediately hold eyelids apart and flush the eye continuously with running water.
 - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
 - Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
 - Transport to hospital or doctor without delay.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin or hair contact occurs:
 - Quickly but gently, wipe material off skin with a dry, clean cloth.
 - Immediately remove all contaminated clothing, including footwear.
 - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
 - Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

- Organochlorines are well absorbed from the lungs, gastrointestinal tract and skin.
- Intoxication from acute oral exposures generally begins within 45 minutes to several hours.
- Diazepam is the anticonvulsant of choice. [Phenobarbitone, sodium phenobarbitone or in repeated convulsions sodium pentothal (2.5% solution) may also be given - calcium gluconate may also be helpful] (Manufacturers; David Gray and Hoechst)
- Usual methods of decontamination (Ipecac / lavage / charcoal / cathartics) are recommended within the first several hours following exposure.
- Dialysis, diuresis and hemoperfusion are ineffective because of extensive tissue binding and large volumes of distribution.
- There is no antidote.

[Ellenhorn and Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not applicable
Upper Explosive Limit (%):	Not Available
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not Available

EXTINGUISHING MEDIA

-
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

-
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

-
- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

-
- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

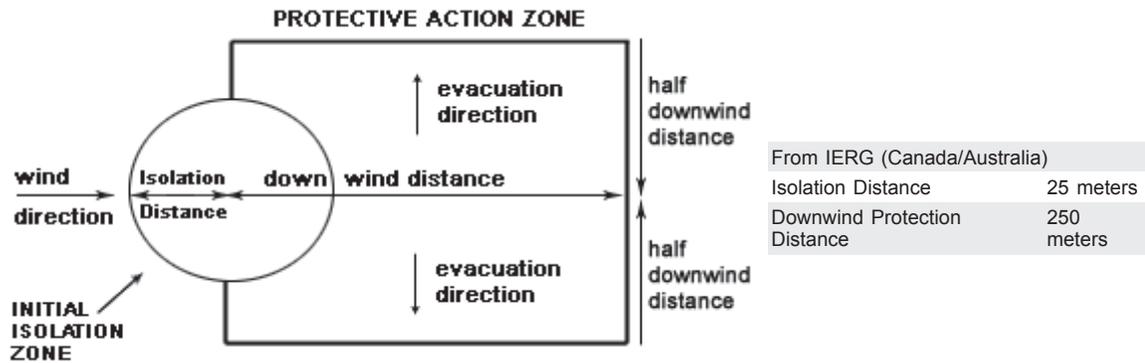
MINOR SPILLS

-
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

-
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



FOOTNOTES

- 1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
- 2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
- 3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
- 4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
- 5 Guide 151 is taken from the US DOT emergency response guide book.
- 6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
 - Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
 - Cans with friction closures and
 - low pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together
 O: May be stored together with specific preventions
 +: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
US - California Permissible Exposure Limits for Chemical Contaminants	DDT (DDT; 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane)		1						
Canada - Ontario Occupational Exposure Limits	DDT (1,1,1-Trichloro-2,2-bis-(p-chlorophenyl)ethane)		1						
US - Minnesota Permissible Exposure Limits (PELs)	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Idaho - Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Alaska Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))		1						
US - Michigan Exposure Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane(DDT))		1						
US - Hawaii Air Contaminant Limits	DDT (DDT (Dichlorodiphenyltrichloroethane))		1		3				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	DDT (DDT (Dichlorodiphenyltrichloroethane))	-	1	-	3				
US - Washington Permissible exposure limits of air contaminants	DDT (DDT (Dichlorodiphenyltrichloroethane))		1		3				

Canada - Northwest Territories

Canada - Northwest Territories Occupational Exposure Limits (English)	DDT (DDT (Dichlorodiphenyltrichloroethane))	1	3	
US ACGIH Threshold Limit Values (TLV)	DDT (DDT [Dichlorodiphenyltrichloroethane])	1		TLV Basis: liver damage
US NIOSH Recommended Exposure Limits (RELs)	DDT	0.5		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	DDT (Dichlorodiphenyltrichloroethane (DDT))	1		
Canada - Nova Scotia Occupational Exposure Limits	DDT (DDT [Dichlorodiphenyltrichloroethane])	1		TLV Basis: liver damage
Canada - Prince Edward Island Occupational Exposure Limits	DDT (DDT [Dichlorodiphenyltrichloroethane])	1		TLV Basis: liver damage
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	DDT (Diesel fuel as total hydrocarbons, (vapour))	100	150	Skin
Canada - Alberta Occupational Exposure Limits	DDT (Diesel fuel, as total hydrocarbons)	100		
Canada - Alberta Occupational Exposure Limits	DDT (Kerosene/Jet fuels, as total hydrocarbon vapour)	200		
Canada - Alberta Occupational Exposure Limits	DDT (DDT (Dichlorodiphenyl trichloroethane))	1		
Canada - British Columbia Occupational Exposure Limits	DDT (DDT (Dichloro-diphenyltrichloroethane))	1		2B
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	DDT (DDT (Dichlorodiphenyltrichloroethane))	1	3	T20
US - Oregon Permissible Exposure Limits (Z1)	DDT (Dichlorodiphenyltrichloroethane (DDT))	1		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	DDT (DDT (Dichlorodiphenyltrichloroethane))	1		
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	DDT (Dichlorodiphenyltrichloroethane (DDT))	1		
Canada - British Columbia Occupational Exposure Limits	DDT (Diesel fuel, as total hydrocarbons, Inhalable)	100 (V)		Skin

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
DDT	500	

MATERIAL DATA

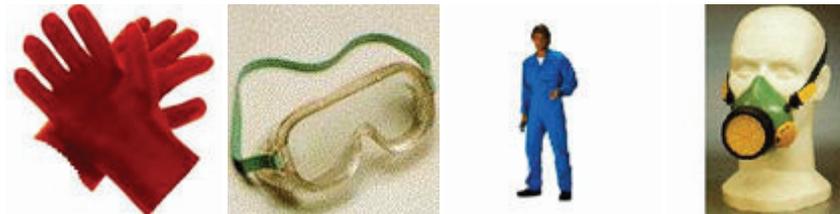
DDT:

■ for DDT:

The TLV-TWA is thought to provide a wide margin of safety in the prevention of acute poisoning and also is thought to be protective against the significant risk of accumulation in body stores.

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

-
- Safety glasses with side shields
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

-
- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.
-
- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

RESPIRATOR

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

-
- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:
 - (a): particle dust respirators, if necessary, combined with an absorption cartridge;
 - (b): filter respirators with absorption cartridge or canister of the right type;
 - (c): fresh-air hoods or masks
- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.

- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)
Within each range the appropriate value depends on:	
Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

State	Divided solid	Molecular Weight	354.48
Melting Range (°F)	227.3	Viscosity	Not Applicable
Boiling Range (°F)	Not available	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not Available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not applicable
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Not applicable	Evaporation Rate	Not applicable
Gas group	IIA		

APPEARANCE

Colourless crystals or white to slightly off-white powder. Odourless or with slight aromatic odour. Insoluble in water; soluble in acetone, benzene, carbon tetrachloride, ether, kerosene, dioxane and pyridine. Since DDT is not biodegradable and is ecologically damaging, its agricultural use in the USA was prohibited in 1973.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

-
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

- - Avoid strong bases.
- Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

DDT

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 87 mg/kg	Nil Reported

Oral (human infant) LDLo: 150 mg/kg

Oral (man) TDLo: 6 mg/kg

Oral (human) TDLo: 16 mg/kg

Oral (human) LDLo: 500 mg/kg

Oral (human) TDLo: 5 mg/kg

Dermal (rat) LD50: 1931 mg/kg

Dermal (rabbit) LD50: 300 mg/kg

■ For DDT:

DDT is moderately to slightly toxic to studied mammalian species via the oral route. Toxicity will vary according to formulation. DDT is readily absorbed through the gastrointestinal tract, with increased absorption in the presence of fats.

One-time administration of DDT to rats at doses of 50 mg/kg led to decreased thyroid function and a single dose of 150 mg/kg led to increased blood levels of liver-produced enzymes and changes in the cellular chemistry in the central nervous system of monkeys. Single doses of 50-160 mg/kg produced tremors in rats, and single doses of 160 mg/kg produced hind leg paralysis in guinea pigs. Mice suffered convulsions following a one-time oral dose of 200 mg/kg. Single administrations of low doses to developing 10-day old mice are reported to have caused subtle effects on their neurological development.

DDT is slightly to practically non-toxic to test animals via the dermal route. It is not readily absorbed through the skin unless it is in solution.

It is thought that inhalation exposure to DDT will not result in significant absorption through the lung alveoli (tiny gas-exchange sacs) but rather that it is probably trapped in mucous secretions and swallowed by exposed individuals following the tracheo-bronchial clearance of secretions by the cilia.

Acute effects likely in humans due to low to moderate exposure may include nausea, diarrhoea, increased liver enzyme activity, irritation (of the eyes, nose or throat), disturbed gait, malaise and excitability; at higher doses, tremors and convulsions are possible. While adults appear to tolerate moderate to high ingested doses of up to 280 mg/kg, a case of fatal poisoning was seen in a child who ingested one ounce of a 5% DDT:kerosene solution.

Chronic toxicity: DDT has caused chronic effects on the nervous system, liver, kidneys, and immune systems in experimental animals. Effects on the nervous system observed in test animals include: tremors in rats at doses of 16-32 mg/kg/day over 26 weeks; tremors in mice at doses of 6.5-13 mg/kg/day over 80-140 weeks; changes in cellular chemistry in the central nervous system of monkeys at doses of 10 mg/kg/day over 100 days, and loss of equilibrium in monkeys at doses of 50 mg/kg/day for up to 6 months.

The main effect on the liver seen in animal studies was localized liver damage. This effect was seen in rats given 3.75 mg/kg/day over 36 weeks, rats exposed to 5 mg/kg/day over 2 years and dogs at doses of 80 mg/kg/day over the course of 39 months. In many cases lower doses produced subtle changes in liver cell physiology, and in some cases higher doses produced more severe effects. In mice doses of 8.33 mg/kg/day over 28 days caused increased liver weight and increased liver enzyme activity. Liver enzymes are commonly involved in detoxification of foreign compounds, so it is unclear whether increased liver enzyme activity in itself would constitute an adverse effect. In some species (monkeys and hamsters), doses as high as 8-20 mg/kg/day caused no observed adverse effects over exposure periods as long as 3.5-7 years.

Kidney effects observed in animal studies include adrenal gland hemorrhage in dogs at doses of 138.5 mg/kg/day over 10 days and adrenal gland damage at 50 mg/kg/day over 150 days in dogs. Kidney damage was also seen in rats at doses of 10 mg/kg/day over 27 months.

Immunological effects observed in test animals include: reduced antibody formation in mice following administration of 13 mg/kg/day for 3-12 weeks and reduced levels of immune cells in rats at doses of 1 mg/kg/day. No immune system effects were observed in mice at doses of 6.5 mg/kg/day for 3-12 weeks.

Dose levels at which effects were observed in test animals are very much higher than those which may be typically encountered by humans. Due to the persistence of DDT and its metabolites in the environment, very low levels may continue to be detected in foodstuffs grown in some areas of prior use. It has been suggested that, depending on patterns of international DDT use and trade, it is possible that dietary exposure levels may actually increase over time. Persons eating fish contaminated with DDT or metabolites may also be exposed via bioaccumulation of the compound in fish.

Even though current dietary levels are quite low, past and current exposures may result in measurable body burdens due to its persistence in the body. More information on the metabolism and storage of DDT and its metabolites in mammalian systems is provided below (Fate in Humans and Animals).

Adverse effects on the liver, kidney and immune system due to DDT exposure have not been demonstrated in humans in any of the studies which have been conducted to date.

Reproductive Effects: There is evidence that DDT causes reproductive effects in test animals. No reproductive effects were observed in rats at doses of 38 mg/kg/day administered at days 15-19 of gestation. In another study in rats, oral doses of 7.5 mg/kg/day for 36 weeks resulted in sterility. In rabbits, doses of 1 mg/kg/day administered on gestation days 4-7 resulted in decreased fetal weights and 10 mg/kg/day on days 7-9 of gestation resulted in increased resorptions. In mice, doses of 1.67 mg/kg/day resulted in decreased embryo implantation and irregularities in the estrus cycle over 28 weeks. It is thought that many of these observed effects may be the result of disruptions in the endocrine (hormonal) system.

Available epidemiological evidence from two studies does not indicate that reproductive effects have occurred in humans as a result of DDT exposure. No associations between maternal blood levels of DDT and miscarriage nor premature rupture of fetal membranes were observed in two separate studies. One study did report a significant association between maternal DDT blood levels and miscarriage, but the presence of other organochlorine chemicals (e.g., PCBs) in maternal blood which may have accounted for the effect make it impossible to attribute the effect to DDT and its metabolites.

Teratogenic Effects: There is evidence that DDT causes teratogenic effects in test animals as well. In mice, maternal doses of 26 mg/kg/day DDT from gestation through lactation resulted in impaired learning performance in maze tests. In a two-generational study of rats, 10 mg/kg/day resulted in abnormal tail development. Epidemiological evidence regarding the occurrence of teratogenic effects as a result of DDT exposure are unavailable. It seems unlikely that teratogenic effects will occur in humans due to DDT at likely exposure levels.

Mutagenic Effects: The evidence for mutagenicity and genotoxicity is contradictory. In only 1 out of 11 mutagenicity assays in various cell cultures and organisms did DDT show positive results. Results of in vitro and in vivo genotoxicity assays for chromosomal aberrations indicated that DDT was genotoxic in 8 out of 12 cases, and weakly genotoxic in 1 case.

In humans, blood cell cultures of men occupationally exposed to DDT showed an increase in chromosomal damage. In a separate study, significant increases in chromosomal damage were reported in workers who had direct and indirect occupational exposure to DDT. Thus it appears that DDT may have the potential to cause genotoxic effects in humans, but does not appear to be strongly mutagenic. It is unclear whether these effects may occur at exposure levels likely to be encountered by most people.

Carcinogenic Effects: The evidence regarding the carcinogenicity of DDT is equivocal. It has been shown to cause increased tumor production (mainly in the liver and lung) in test animals such as rats, mice and hamsters in some studies but not in others. In rats, liver tumors were induced in three separate studies at doses of 12.5 mg/kg/day over periods of 78 weeks to life, and thyroid tumors were induced at doses of 85 mg/kg/day over 78 weeks. In mice, lifetime doses of 0.4 mg/kg/day resulted in lung tumors in the second generation and leukemia in the third generation; liver tumors were induced at oral doses of 0.26 mg/kg/day in two separate studies over several generations. In hamsters, significant increases in adrenal gland tumors were

seen at doses of 83 mg/kg/day in females (but not males) , and in males (but not females) at doses of 40 mg/kg/day. In other studies, however, no carcinogenic activity was observed in rats at doses less than 25 mg/kg/day; no carcinogenic activity was seen in mice with at doses of 3-23 mg/kg/day over an unspecified period, and in other hamster studies there have been no indications of carcinogenic effects.

The available epidemiological evidence regarding DDT's carcinogenicity in humans, when taken as a whole, does not suggest that DDT and its metabolites are carcinogenic in humans at likely dose levels. In several epidemiological studies, no significant associations were seen between DDT exposure and disease, but in one other study, a weak association was observed. In this latter study, which found a significant association between long-term, high DDT exposures and pancreatic cancers in chemical workers, there were questions raised as to the reliability of the medical records of a large proportion of the cancer cases.

Organ Toxicity: Acute human exposure data and animal studies reveal that DDT can affect the nervous system, liver, kidney. Increased tumor production in the liver and lung has been observed in test animals. An association with pancreatic cancer was suggested in humans in one study.

Fate in Humans & Animals: DDT is very slowly transformed in animal systems. Initial degradates in mammalian systems are 1,1-dichloro-2,2-bis(p-dichlorodiphenyl)ethylene (DDE) and 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane (DDD), which are very readily stored in fatty tissues. These compounds in turn are ultimately transformed into bis(dichlorodiphenyl) acetic acid (DDA) via other metabolites at a very slow rate. DDA, or conjugates of DDA, are readily excreted via the urine.

Levels of DDT or metabolites may occur in fatty tissues (e.g. fat cells, the brain, etc.) at levels of up to several hundred times that seen in the blood. DDT or metabolites may also be eliminated via mother's milk by lactating women.

WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

ADI: 0.002 mg/kg/day

NOEL: 0.25 mg/kg/day

CARCINOGEN

DDT [p,p'-DDT]	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
Non-arsenical insecticides (occupational exposures in spraying and application of)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2A
p,p'-Dichlorodiphenyltrichloroethane (DDT)	US EPA Carcinogens Listing	Carcinogenicity	B2
p,p'-Dichlorodiphenyltrichloroethane (DDT)	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B2
DDT [Dichlorodiphenyltrichloroethane]	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A3
DDT	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
DDT (TOTAL)	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
DDT	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
DDT (TOTAL)	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
DDT [Dichlorodiphenyltrichloroethane]	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca

SKIN

DDT Canada - Ontario Occupational Exposure Limits - Skin	Notes	Skin
DDT US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	Skin
DDT Canada - Quebec Permissible Exposure Values for Airborne Contaminants - Skin (French)	Notes	Skin
DDT US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	X
DDT US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin	Skin Designation	X
DDT US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	X
DDT US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
DDT Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
DDT US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	X
DDT US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
DDT ND	Skin Designation	X
DDT US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
DDT US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
DDT US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
DDT Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

DDT:

■ Daphnia magna EC50 (48hr.) (mg/l):	0.002- 0.00
■ Half- life Soil - High (hours):	1.40E+05
■ Half- life Soil - Low (hours):	17520

■ Half- life Air - High (hours):	177
■ Half- life Air - Low (hours):	17.7
■ Half- life Surface water - High (hours):	8400
■ Half- life Surface water - Low (hours):	168
■ Half- life Ground water - High (hours):	2.70E+05
■ Half- life Ground water - Low (hours):	384
■ Aqueous biodegradation - Aerobic - High (hours):	1.37E+05
■ Aqueous biodegradation - Aerobic - Low (hours):	17520
■ Aqueous biodegradation - Anaerobic - High (hours):	2400
■ Aqueous biodegradation - Anaerobic - Low (hours):	384
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	100%
■ Photolysis maximum light absorption - High (nano- m):	<282
■ Photooxidation half- life water - High (hours):	8400
■ Photooxidation half- life water - Low (hours):	168
■ Photooxidation half- life air - High (hours):	177
■ Photooxidation half- life air - Low (hours):	17.7
■ First order hydrolysis half- life (hours):	1.94E+05

- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ For DDT

log Kow : 6.19

Half-life (hr) air: 170

Half-life (hr) H₂O surface water: 5500

Half-life (hr) soil: 17000

BCF : 12000-40000

Environmental fate:

Breakdown in Soil and Groundwater: DDT is very highly persistent in the environment, with a reported half life of between 2-15 years and is immobile in most soils. Routes of loss and degradation include runoff, volatilization, photolysis and biodegradation (aerobic and anaerobic). These processes generally occur only very slowly. Breakdown products in the soil environment are DDE and DDD, which are also highly persistent and have similar chemical and physical properties.

Due to its extremely low solubility in water, DDT will be retained to a greater degree by soils and soil fractions with higher proportions of soil organic matter. It may accumulate in the top soil layer in situations where heavy applications are (or were) made annually; e.g., for apples. Generally DDT is tightly sorbed by soil organic matter, but it (along with its metabolites) has been detected in many locations in soil and groundwater where it may be available to organisms. This is probably due to its high persistence; although it is immobile or only very slightly mobile, over very long periods of time it may be able to eventually leach into groundwater, especially in soils with little soil organic matter.

Residues at the surface of the soil are much more likely to be broken down or otherwise dissipated than those below several inches. Studies in Arizona have shown that volatilization losses may be significant and rapid in soils with very low organic matter content (desert soils) and high irradiance of sunlight, with volatilization losses reported as high as 50% in 5 months. In other soils (Hood River and Medford) this rate may be as low as 17- 18% over 5 years. Volatilisation loss will vary with the amount of DDT applied, proportion of soil organic matter, proximity to soil-air interface and the amount of sunlight.

Breakdown of Chemical in Surface Water: DDT may reach surface waters primarily by runoff, atmospheric transport, drift, or by direct application (e.g. to control mosquito-borne malaria). The reported half-life for DDT in the water environment is 56 days in lake water and approximately 28 days in river water. The main pathways for loss are volatilization, photodegradation, adsorption to water-borne particulates and sedimentation. Aquatic organisms, as noted above, also readily take up and store DDT and its metabolites. Field and laboratory studies in the United Kingdom demonstrated that very little breakdown of DDT occurred in estuary sediments over the course of 46 days.

Breakdown of Chemical in Vegetation: DDT does not appear to be taken up or stored by plants to a great extent. It was not translocated into alfalfa or soybean plants, and only trace amounts of DDT or its metabolites were observed in carrots, radishes and turnips all grown in DDT-treated soils. Some accumulation was reported in grain, maize and rice-plants, but little translocation occurred and residues were located primarily in the roots.

Ecotoxicity:

Effects on Birds:

Bird dietary LD50: mallard duck 2240 mg/kg, Japanese quail 841 mg/kg, pheasant 1334 mg/kg

Reported dietary LD50s in such species as bobwhite quail, California quail, red-winged blackbird, cardinal, house sparrow, blue jay, sandhill crane and clapper rail also indicate slight toxicity both in acute 5-day trials and over longer periods of up to 100 days. In birds, exposure to DDT occurs mainly through the food web through predation on aquatic and/or terrestrial species having body burdens of DDT, such as fish, earthworms and other birds.

There has been much concern over chronic exposure of bird species to DDT and effects on reproduction, especially eggshell thinning and embryo deaths. The mechanisms of eggshell thinning are not fully understood. It is thought that this may occur from the major metabolite, DDE, and that predator species of birds are the most sensitive to these effects. Laboratory studies on bird reproduction have demonstrated the potential of DDT and DDE to cause subtle effects on courtship behavior, delays in pairing and egg laying and decreases in egg weight in ring doves and Bengalese finches. The implications of these for long-term survival and reproduction of wild bird species is unclear.

There is evidence that synergism may be possible between DDT's metabolites and organophosphate (cholinesterase-inhibiting) pesticides to produce greater toxicity to the nervous system and higher mortality. Aroclor (polychlorinated biphenyls, or PCBs) may result in additive effects on eggshell thinning.

Effects on Aquatic Species

Fish LC50 (96 h): coho salmon 4 ug/l, rainbow trout 8.7 ug/l, northern pike 2.7 ug/l, black bullhead 4.8 ug/l, bluegill sunfish 8.6 ug/l, largemouth bass 1.5 ug/l, walleye 2.9 ug/l, fathead minnow 21.5 ug/l, channel catfish 12.2 ug/l, largemouth bass 1.5 ug/l, guppy 56 ug/l

DDT is very highly toxic to many aquatic invertebrate species. Reported 96-hour LC50s in various aquatic invertebrates (e.g., stoneflies, midges, crayfish, sow bugs) range from 0.18 ug/L to 7.0 ug/L, and 48-hour LC50s are 4.7 ug/L for daphnids and 15 ug/L for sea shrimp. Other reported 96-hour LC50s for various aquatic invertebrate species are from 1.8 ug/L to 54 ug/L. Early developmental stages are more susceptible than adults to DDT's effects. The reversibility of some effects, as well as the

development of some resistance, may be possible in some aquatic invertebrates .
 DDT is very highly toxic to fish species as well. . Observed toxicity in coho and chinook salmon was greater in smaller fish than in larger . It is reported that DDT levels of 1 ng/L were sufficient to affect the hatching of coho salmon eggs DDT may be moderately toxic to some amphibian species and larval stages are probably more susceptible than adults
 In addition to acute toxic effects, DDT may bioaccumulate significantly in fish and other aquatic species, leading to long-term exposure. This occurs mainly through uptake from sediment and water into aquatic flora and fauna, and also fish . Fish uptake of DDT from the water will be size-dependent with smaller fish taking up relatively more than larger fish . A half- time for elimination of DDT from rainbow trout was estimated to be 160 days .
 The reported bioconcentration factor for DDT is 1,000 to 1,000,000 in various aquatic species, and bioaccumulation may occur in some species at very low environmental concentrations . Bioaccumulation may also result in exposure to species which prey on fish or other aquatic organisms (e.g., birds of prey).
Effects on Other Animals (Nontarget species)
 Earthworms are not susceptible to acute effects of DDT and its metabolites at levels higher than those likely to be found in the environment, but they may serve as an exposure source to species that feed on them. DDT is non-toxic to bees; the reported topical LD50 for DDT in honeybees is 27 ug/bee . Laboratory studies indicate that bats may be affected by DDT released from stored body fat during long migratory periods.
 ■ Outbreaks of poisoning from food contaminated with organochlorines are characterized by headache, nausea, vomiting, restlessness, irritability, vertigo, muscle twitching, confusion, stupor, coma and convulsions.
 The organochlorine pesticides are highly soluble in lipids and most organic solvents but have low water solubilities and low vapor pressure.
 Adsorption in various soils depends strongly on the presence of soil organic matter. Once adsorbed they do not readily desorb. Such compounds do not as a consequence leach or diffuse in soils and transport to the hydrosphere from contaminated soils will be largely as a result of the erosion of soil particles or sediments, rather than by desorption and dissolution.
 When organochlorines are poorly adsorbed, as in sandy soils, vaporization losses are significant. Volatilization from water or soil may also occur.
 The actual evaporation rate depends on factors such as temperature, soil properties, soil water content and other physicochemical properties such as water solubility and degree of adsorption. The importance of soil moisture in volatilization led to the use of the term "co-distillation".
 The effect observed in soil however is more accurately described as displacement of the sorbed pesticides by water molecules. As a result compounds which otherwise possess low water solubility are quite volatile from water.
 Degradation of the organochlorines is slow compared to other classes of insecticide and in soil and water is due mainly to the action of micro- organisms. Pathways include dechlorination and dehydrochlorination. Oxidation is only moderately important. Epoxidations and rearrangements are common amongst the cyclodiene pesticides. These rearrangement reactions produce complicated "cage-like" structures that are toxic.
 Bioaccumulation of the some organochlorines (notably DDT and dieldrin) are higher in aquatic ecosystems than in terrestrial ecosystems. Physicochemical properties such as high lipid solubility, low water solubility and chemical stability are the most significant factors behind such bioaccumulation.
 The effects of bioaccumulation are manifest at the top of the food chain where, for example, predatory fish and birds, suffer from acute and chronic toxicity and reproductive failures. Effects may range from obvious toxicity to subtle behavioral changes. Evidence exists that the population effects are reversible with time.
 ■ DO NOT discharge into sewer or waterways.
 ■ The material is classified as an ecotoxin* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l
 * Classification of Substances as Ecotoxic (Dangerous to the Environment)
 Appendix 8, Table 1
 Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
DDT	HIGH	HIGH	HIGH	LOW

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When DDT is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U061 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN2761	PG:	III
Label Codes:	6.1	Special provisions:	IB8, IP3, T1, TP33
Packaging: Exceptions:	153	Packaging: Non-bulk:	213
Packaging: Exceptions:	153	Quantity limitations: Passenger aircraft/rail:	100 kg
Quantity Limitations: Cargo aircraft only:	200 kg	Vessel stowage: Location:	A
Vessel stowage: Other:	40	S.M.P.:	Severe

Hazardous materials descriptions and proper shipping names:
Organochlorine pesticides, solid, toxic

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	2761	Packing Group:	III
Special provisions:	A3		

Shipping Name: ORGANOCHLORINE PESTICIDE, SOLID, TOXIC *(CONTAINS DDT)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	2761	Packing Group:	III
EMS Number:	F-A,S-A	Special provisions:	61 223 274 944

Limited Quantities: 5 kg

Shipping Name: ORGANOCHLORINE PESTICIDE, SOLID, TOXIC(contains DDT)

Section 15 - REGULATORY INFORMATION

DDT (CAS: 50-29-3) is found on the following regulatory lists;

"Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Ontario Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Domestic Substances List (DSL)", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 3 Export Control List - Part 2 Substances Subject to Notification or Consent", "Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life", "Canada Prohibited Toxic Substances (English)", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "OECD Representative List of High Production Volume (HPV) Chemicals", "OSPAR List of Substances of Possible Concern", "United Nations List of Prior Informed Consent Chemicals - French", "United Nations List of Prior Informed Consent Chemicals - Spanish", "United Nations List of Prior Informed Consent Chemicals (English)", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which production, use or other presence must be reported", "US - California Environmental Health Standards for the Management of Hazardous Waste - List of Organic Persistent and Bioaccumulative Toxic Substances and Their STLC & TTLC Values", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity", "US - California Proposition 65 - Reproductive Toxicity", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous Constituents", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Class A toxic air pollutants: Known and Probable Carcinogens", "US - Washington Dangerous waste constituents list", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US CERCLA Priority List of Hazardous Substances", "US CERCLA Top 20 Priority List of Hazardous Substances", "US CWA (Clean Water Act) - List of Hazardous Substances", "US CWA (Clean Water Act) - Priority Pollutants", "US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA Carcinogens Listing", "US EPA National Priorities List - Superfund Chemical Data Matrix (SCDM) - Hazard Ranking System - Hazardous Substance Benchmarks", "US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US RCRA (Resource Conservation & Recovery Act) - Appendix IX to Part 264 Ground-Water Monitoring List 1", "US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Inorganic and Organic Constituents 1", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements", "US

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Inhalation may produce health damage*.
- May affect fertility*.

* (limited evidence).

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
DDT	0.01 mg/m3	1000	R	3	-

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise. CR = Cancer Risk/10000; UF = Uncertainty factor: TLV believed to be adequate to protect reproductive health; LOD: Limit of detection Toxic endpoints have also been identified as: D = Developmental; R = Reproductive; TC = Transplacental carcinogen Jankovic J., Drake F.: A Screening Method for Occupational Reproductive Health Risk: American Industrial Hygiene Association Journal 57: 641-649 (1996).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

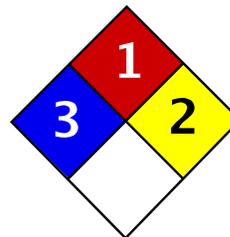
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: Apr-27-2009

Print Date: Apr-22-2010



Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance is toxic to kidneys, lungs, the nervous system, mucous membranes.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

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

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not

present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.

Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation.

Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic

Pennsylvania RTK: Arsenic

Massachusetts RTK: Arsenic

TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed.

R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information**References:**

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

-Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec.

-Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.

-SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.

-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

-Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:16 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.

SUPELCO,INC. -- BENZO(A)ANTHRACENE 0.1G,48563 -- 6810-00N010656

===== Product Identification =====

Product ID: BENZO(A)ANTHRACENE 0.1G,48563

MSDS Date: 05/16/1985

FSC: 6810

NIIN: 00N010656

MSDS Number: BHYRL

=== Responsible Party ===

Company Name: SUPELCO, INC.

Address: SUPELCO PARK

City: BELLEFONTE

State: PA

ZIP: 16823-0048

Info Phone Num: 814-359-3441

Emergency Phone Num: 814-359-3441

CAGE: HO582

=== Contractor Identification ===

Company Name: SIGMA-ALDRICH INC.

Address: 3050 SPRUCE STREET

Box: 14508

City: ST. LOUIS

State: MO

ZIP: 63103

Country: US

Phone: 314-771-5765/414-273-3850X5996

CAGE: 54968

Company Name: SUPELCO, INC.

Address: SUPELCO PARK

Box: City: BELLEFONTE

State: PA

ZIP: 16823-0048

Phone: 814-359-3441

CAGE: HO582

===== Composition/Information on Ingredients =====

Ingred Name: BENZ A ANTHRACENE (SARA III)

CAS: 56-55-3

RTECS #: CV9275000

Other REC Limits: N/K

ACGIH TLV: A2 ; 9394

EPA Rpt Qty: 10 LBS

DOT Rpt Qty: 10 LBS

===== Hazards Identification =====

Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO

Reports of Carcinogenicity: NTP:YES IARC:YES OSHA:NO

Health Hazards Acute and Chronic: SEE SIGNS AND SYMPTOMS OF
OVEREXPOSURE.Explanation of Carcinogenicity: SUSPECTED HUM CARCIN/KNOWN ANIM CARCIN
(NTP 1985). INADEQ EVID FOR CARC IN HUM, SUFF EVID FOR CARC IN
ANIMALS (IARC 1987).

Effects of Overexposure: EYES/SKIN/INGESTION/INHALATION: N/K .

Medical Cond Aggravated by Exposure: N/K

===== First Aid Measures =====

First Aid:EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH
LARGE VOLUMES OF WATER.REMOVE CONTAMINATED
CLOTHING.INGESTION:CONTACT PHYSICIAN.INHALATION:IMMEDIATELY MOVE
TO FRESH AIR.GIVE OXYGEN IF BREATHING IS LABORED.IF BREATHING
STOPS,GIVE ARTIFICIAL RESPIRATION.CONTACT PHYSICIAN.

===== Fire Fighting Measures =====

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:CO*2,FOAM,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .

===== Accidental Release Measures =====

Spill Release Procedures:SWEEP UP MATERIAL.VENTILATE AREA.AVOID
GENERATING DUST.
Neutralizing Agent:N/K

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY
LOCATION.KEEP AWAY FROM OXIDIZERS.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR
EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR
CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RUBBER
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:438C,820F
Melt/Freeze Pt:M.P/F.P Text:157C,315F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:PALE YELLOW CRYSTAL.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH
FEDERAL,STATE AND LOCAL REGULATIONS .

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department
of Defense. The United States of America in no manner whatsoever,

expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.



[Division of Facilities Services](#)

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

BENZO (A) PYRENE, MD-1956

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Compositon/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
BENZO (A) PYRENE, MD-1956**

Product Identification: BENZO (A) PYRENE, MD-1956

Date of MSDS: 03/25/1986 **Technical Review Date:** 09/30/1992

FSC: 6810 **NIIN:** LIIN: 00N034844

Submitter: N EN

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: MERCK FROSST CANADA INC
Post Office Box: 899
Manufacturer's Address1:
Manufacturer's Address2: POINTE CLAIRE-DORVAL, QUEBEC, CANADA, NK 00000
Manufacturer's Country: NK
General Information Telephone: 800-325-9034;514-697-2823
Emergency Telephone: 800-325-9034;514-697-2823
Emergency Telephone: 800-325-9034;514-697-2823
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: N
Published: Y
CAGE: 09578
Special Project Code: N

Contractor Information

Contractor's Name: MERCK FROSST CANADA INC
Contractor's Address1: UNKNOWN
Contractor's Address2: POINTE CLAIRE-DORVAL, QUEBEC, CANADA, PQ 00000
Contractor's Telephone: 800-325-9034; 514-697-2823
Contractor's CAGE: 09578

Section 2 - Compositon/Information on Ingredients BENZO (A) PYRENE, MD-1956

Ingredient Name: BENZO (A) PYRENE
Ingredient CAS Number: 50-32-8 **Ingredient CAS Code:** M
RTECS Number: DJ3675000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: >99
% Enviromental Weight:
Other REC Limits: N/K
OSHA PEL: 0.2 MG/M3 **OSHA PEL Code:** M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: A2, MG/M3;9394 **ACGIH TLV Code:** M
ACGIH STEL: N/P ACGIH STEL Code:
EPA Reporting Quantity: 1 LB
DOT Reporting Quantity: 1 LB
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview
BENZO (A) PYRENE, MD-1956

Health Hazards Acute & Chronic: CANCER SUSPECT (GASTRIC), MUTAGENIC, NEOPLASTIC.

Signs & Symptoms of Overexposure:
SEE HEALTH HAZARDS.

Medical Conditions Aggravated by Exposure:
NONE SPECIFIED BY MANUFACTURER.

LD50 LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.

Route of Entry Indicators:

Inhalation: YES

Skin: NO

Ingestion: YES

Carcinogenicity Indicators

NTP: YES

IARC: YES

OSHA: NO

Carcinogenicity Explanation: BENZO (A) PYRENE: GROUP 2A (IARC), ANTICIPATED TO BE A CARCINOGEN (NTP).

Section 4 - First Aid Measures
BENZO (A) PYRENE, MD-1956

First Aid:

SUMMON A PHYSICIAN. SKIN: WASH WITH WATER. INHALATION: REMOVE TO FRESH AIR, ARTIFICIAL RESPIRATION OR OXYGEN IF NECESSARY. INGESTION: GIVE WATER AND INDUCE VOMITING. MEDICAL ASSISTANCE FOR GASTRIC LAV AGE. EYE: FLUSH WITH WATER FOR AT LEAST 15 MINUTES (FP N).

Section 5 - Fire Fighting Measures
BENZO (A) PYRENE, MD-1956

Fire Fighting Procedures:

WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).

Unusual Fire or Explosion Hazard:

NONE SPECIFIED BY MANUFACTURER.

Extinguishing Media:

CO*2, DRY CHEMICAL, ALCOHOL FOAM.

Flash Point: Flash Point Text: N/K

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/K

Upper Limit(s): N/K

Section 6 - Accidental Release Measures
BENZO (A) PYRENE, MD-1956

Spill Release Procedures:

PROVIDE GOOD VENTILATION. CAREFULLY SCOOP UP AND TRANSFER TO A CLOSED CONTAINER.

Section 7 - Handling and Storage
BENZO (A) PYRENE, MD-1956

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection
BENZO (A) PYRENE, MD-1956

Respiratory Protection:

WEAR NIOSH/MSHA APPROVED SELF-CONTAINED BREATHING APPARATUS.

Ventilation:

LOCAL EXHAUST: STRONG FUMEHOOD.

Protective Gloves:

RUBBER GLOVES.

Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment: PROTECTIVE CLOTHING. PROVIDE SAFETY SHOWER AND EYEWASH STATION NEAR WORKPLACE.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Supplemental Health & Safety Information: NONE SPECIFIED BY MANUFACTURER.

Section 9 - Physical & Chemical Properties
BENZO (A) PYRENE, MD-1956

HCC: N1

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: 594F,312C

Melting/Freezing Point: Melting/Freezing Text: 354F,179C

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/K Vapor Density: N/K

Percent Volatile Organic Content:

Specific Gravity: N/K

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: <0.1

Appearance and Odor: YELLOW SOLID.
Percent Volatiles by Volume: LOW
Corrosion Rate: N/K

Section 10 - Stability & Reactivity Data
BENZO (A) PYRENE, MD-1956

Stability Indicator: YES
Materials to Avoid:
STRONG OXIDIZING AGENTS.
Stability Condition to Avoid:
NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:
CARBON MONOXIDE, CARBON DIOXIDE ON COMBUSTION.
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NOT RELEVANT.

Section 11 - Toxicological Information
BENZO (A) PYRENE, MD-1956

Toxicological Information:
N/P

Section 12 - Ecological Information
BENZO (A) PYRENE, MD-1956

Ecological Information:
N/P

Section 13 - Disposal Considerations
BENZO (A) PYRENE, MD-1956

Waste Disposal Methods:
VIA LICENSED DISPOSAL COMPANY. DISPOSE IN ACCORDANCE WITH FEDERAL, STATE
AND LOCAL REGULATIONS (FP N).

Section 14 - MSDS Transport Information
BENZO (A) PYRENE, MD-1956

Transport Information:
N/P

Section 15 - Regulatory Information
BENZO (A) PYRENE, MD-1956

SARA Title III Information:
N/P
Federal Regulatory Information:
N/P
State Regulatory Information:
N/P

Section 16 - Other Information
BENZO (A) PYRENE, MD-1956

Other Information:

N/P

HMIS Transportation Information**Product Identification:** BENZO (A) PYRENE, MD-1956**Transportation ID Number:** 39315**Responsible Party CAGE:** 09578**Date MSDS Prepared:** 03/25/1986**Date MSDS Reviewed:** 02/17/1993**MFN:** 02/17/1993**Submitter:** N TN**Status Code:** C**Container Information****Unit of Issue:** NK**Container Quantity:** NK**Type of Container:****Net Unit Weight:****Article without MSDS:** N**Technical Entry NOS Shipping Number:****Radioactivity:****Form:****Net Explosive Weight:****Coast Guard Ammunition Code:****Magnetism:** N/P**AF MMAC Code:****DOD Exemption Number:****Limited Quantity Indicator:****Multiple Kit Number:** 0**Kit Indicator:** N**Kit Part Indicator:** N**Review Indicator:** Y**Additional Data:**

NOT REGULATED FOR TRANSPORTATION

Department of Transportation Information**DOT Proper Shipping Name:** NOT REGULATED BY THIS MODE OF TRANSPORTATION**DOT PSN Code:** ZZZ**Symbols:** N/R**DOT PSN Modifier:****Hazard Class:** N/R**UN ID Number:** N/R**DOT Packaging Group:** N/R**Label:** N/R**Special Provision(s):** N/R**Packaging Exception:** N/R**Non Bulk Packaging:** N/R

Bulk Packaging: N/R
Maximum Quantity in Passenger Area: N/R
Maximum Quantity in Cargo Area: N/R
Stow in Vessel Requirements: N/R
Requirements Water/Sp/Other: N/R

IMO Detail Information

IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO PSN Modifier:
IMDG Page Number: N/R
UN Number: N/R
UN Hazard Class: N/R
IMO Packaging Group: N/R
Subsidiary Risk Label: N/R
EMS Number: N/R
Medical First Aid Guide Number: N/R

IATA Detail Information

IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA PSN Modifier:
IATA UN Id Number: N/R
IATA UN Class: N/R
Subsidiary Risk Class: N/R
UN Packaging Group: N/R
IATA Label: N/R
Packaging Note for Passengers: N/R
Maximum Quantity for Passengers: N/R
Packaging Note for Cargo: N/R
Maximum Quantity for Cargo: N/R
Exceptions: N/R

AFI Detail Information

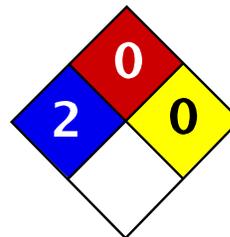
AFI Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI Symbols:
AFI PSN Code: ZZZ
AFI PSN Modifier:
AFI UN Id Number: N/R
AFI Hazard Class: N/R
AFI Packing Group: N/R
AFI Label: N/R
Special Provisions: N/A
Back Pack Reference: N/A

HAZCOM Label Information

Product Identification: BENZO (A) PYRENE, MD-1956
CAGE: 09578
Assigned Individual: N
Company Name: MERCK FROSST CANADA INC
Company PO Box:
Company Street Address1: UNKNOWN
Company Street Address2: POINTE CLAIRE-DORVAL, QUEBEC, CANADA, PQ 00000 US
Health Emergency Telephone: 800-325-9034;514-697-2823
Label Required Indicator: Y

Date Label Reviewed: 09/30/1992
Status Code: C
Manufacturer's Label Number:
Date of Label: 09/30/1992
Year Procured: N/K
Organization Code: G
Chronic Hazard Indicator: Y
Eye Protection Indicator: YES
Skin Protection Indicator: YES
Respiratory Protection Indicator: YES
Signal Word: WARNING
Health Hazard: Slight
Contact Hazard: Moderate
Fire Hazard: None
Reactivity Hazard: None

8/8/2002 7:08:14 PM



Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Barium carbonate MSDS

Section 1: Chemical Product and Company Identification

<p>Product Name: Barium carbonate</p> <p>Catalog Codes: SLB3556, SLB1225, SLD2545</p> <p>CAS#: 513-77-9</p> <p>RTECS: CQ8600000</p> <p>TSCA: TSCA 8(b) inventory: Barium carbonate</p> <p>CI#: Not available.</p> <p>Synonym: Barium monocarbonate; Carbonic acid, barium salt.</p> <p>Chemical Name: Barium Carbonate</p> <p>Chemical Formula: BaCO₃</p>	<p>Contact Information:</p> <p>Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396</p> <p>US Sales: 1-800-901-7247 International Sales: 1-281-441-4400</p> <p>Order Online: ScienceLab.com</p> <p>CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300</p> <p>International CHEMTREC, call: 1-703-527-3887</p> <p>For non-emergency assistance, call: 1-281-441-4400</p>
---	--

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Barium carbonate	513-77-9	100

Toxicological Data on Ingredients: Barium carbonate: ORAL (LD50): Acute: 200 mg/kg [Mouse]. 418 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at

least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

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

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Non combustible.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg(Ba)/m) from ACGIH (TLV) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: 197.34 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Decomposition temperature: 1300°C (2372°F)

Melting Point: 811°C (1491.8°F)

Critical Temperature: Not available.

Specific Gravity: 4.43 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Very slightly soluble in cold water.

Solubility in water: 0.024 g/l; 0.0022 g/l @ 18 deg. C. Almost insoluble in water.

Soluble in solution of dilute hydrochloric acid, nitric acid, or acetic acid.

Soluble in solution of ammonium chloride or ammonium nitrate.

Insoluble in sulfuric acid.

Soluble in ethanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Contact with acids causes formation of Carbon dioxide gas that may cause suffocation in enclosed spaces.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 200 mg/kg [Mouse].

Chronic Effects on Humans: CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: May cause skin irritation.

Eyes: May cause eye irritation.

Inhalation: May cause respiratory tract irritation. May cause benign pneumoconiosis (baritosis). This is not incapacitating and is usually reversible with cessation of exposure. Inhalation may have similar systemic effects as ingestion since Barium Carbonate is cleared from the lungs into the blood stream.

Ingestion: Harmful if swallowed. May affect behavior/central nervous system/peripheral nervous system, gastrointestinal system, respiration, cardiovascular system, and kidneys. Symptoms may include: weakness, nausea, vomiting, diarrhea, hypermotility, excessive salivation, colic, convulsive tremors, giddiness, dilated pupils, increased blood pressure, heart palpitations, hemorrhages in the gastrointestinal tract and kidneys, muscular paralysis, dryness of mouth, thirst, sweating, tingling around the mouth and neck, tightness in the throat, respiratory depression, dysarthria, headaches, muscle twitching, urinary retention, testicular tenderness. May also cause hypokalemia with associated electrocardiogram changes. Serious cases may result in convulsions

and death.
Chronic Potential Health Effects:
Inhalation: Prolonged inhalation may cause benign pneumoconiosis (baritosis).

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Barium carbonate

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):

R22- Harmful if swallowed.

S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:14 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.



[Division of Facilities Services](#)

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

F74 BENZO/B/FLUORANTHENE

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Compositon/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
F74 BENZO/B/FLUORANTHENE**

Product Identification: F74 BENZO/B/FLUORANTHENE

Date of MSDS: 09/11/1990 **Technical Review Date:** 12/14/1994

FSC: 6550 **NIIN:** LIIN: 00F037517

Submitter: F BT

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: CHEM SERVICE INC
Post Office Box: 3108
Manufacturer's Address1: 660 TOWER LN
Manufacturer's Address2: WEST CHESTER, PA 19381-3108
Manufacturer's Country: US
General Information Telephone: 215-692-3026/800-452-9994
Emergency Telephone: 215-692-3026/800-452-9994
Emergency Telephone: 215-692-3026/800-452-9994
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 84898
Special Project Code: N

Preparer Information

Preparer's Name: CHEM SERVICE INC
Post Office Box: 3108
Preparer's Address1: N/K
Preparer's Address2: WEST CHESTER, PA 19381
Preparer's CAGE: 84898
Assigned Individual: N

Contractor Information

Contractor's Name: CHEM SERVICE INC
Post Office Box: 3108
Contractor's Address1: N/K
Contractor's Address2: WEST CHESTER, PA 19381
Contractor's Telephone: 215-692-3026
Contractor's CAGE: 84898

Contractor Information

Contractor's Name: CHEM SERVICE, INC
Post Office Box: 599
Contractor's Address1: 660 TOWER LN
Contractor's Address2: WEST CHESTER, PA 19301-9650
Contractor's Telephone: 610-692-3026
Contractor's CAGE: 8Y898

Section 2 - Compositon/Information on Ingredients
F74 BENZO/B/FLUORANTHENE

Ingredient Name: BENZO (B) FLUORANTHENE (SUSPECTED CARCINOGEN BY NTP, IARC GROUP 2B) *94-4*
Ingredient CAS Number: 205-99-2 **Ingredient CAS Code:** M
RTECS Number: DF6350000 **RTECS Code:** M

=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: N/K
% Enviromental Weight:
Other REC Limits: A2 CARCINOGEN
OSHA PEL: N/K OSHA PEL Code: M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: N/K ACGIH TLV Code: M
ACGIH STEL: N/P ACGIH STEL Code:
EPA Reporting Quantity: 1 LB
DOT Reporting Quantity: 1 LB
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview
F74 BENZO/B/FLUORANTHENE

Health Hazards Acute & Chronic: N/K

Signs & Symptoms of Overexposure:
N/K

Medical Conditions Aggravated by Exposure:
N/K

LD50 LC50 Mixture: ORAL LD50 (RAT/MOUSE): 72 MG/KG

Route of Entry Indicators:
Inhalation: NO
Skin: NO
Ingestion: NO

Carcenogenicity Indicators
NTP: YES
IARC: YES
OSHA: NO

Carcinogenicity Explanation: SEE INGREDIENTS

Section 4 - First Aid Measures
F74 BENZO/B/FLUORANTHENE

First Aid:

EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NOT BURNED, WASH W/SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. KEEP WARM & QUIET. IN GESTION: DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING OCCURS, WATCH CLOSELY TO AVOID AIRWAY OBSTRUCTION. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Section 5 - Fire Fighting Measures F74 BENZO/B/FLUORANTHENE

Fire Fighting Procedures:

N/K

Unusual Fire or Explosion Hazard:

N/K

Extinguishing Media:

CO₂, DRY CHEMICAL POWDER/SPRAY.

Flash Point: Flash Point Text: N/K

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/K

Upper Limit(s): N/K

Section 6 - Accidental Release Measures F74 BENZO/B/FLUORANTHENE

Spill Release Procedures:

EVACUATE AREA. WEAR APPROPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.

Section 7 - Handling and Storage F74 BENZO/B/FLUORANTHENE

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection F74 BENZO/B/FLUORANTHENE

Respiratory Protection:

WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.

Ventilation:

CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.

Protective Gloves:

N/K

Eye Protection: EYE SHIELDS

Other Protective Equipment: N/K

Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Health & Safety Information: N/K

Section 9 - Physical & Chemical Properties
F74 BENZO/B/FLUORANTHENE

HCC:

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: N/K

Melting/Freezing Point: Melting/Freezing Text: 334.4F

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/K Vapor Density: N/K

Percent Volatile Organic Content:

Specific Gravity: N/K

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/K

Solubility in Water: N/K

Appearance and Odor: CRYSTALLINE SOLID

Percent Volatiles by Volume: N/K

Corrosion Rate: N/K

Section 10 - Stability & Reactivity Data
F74 BENZO/B/FLUORANTHENE

Stability Indicator: YES

Materials to Avoid:

N/K

Stability Condition to Avoid:

N/K

Hazardous Decomposition Products:

N/K

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

N/K

Section 11 - Toxicological Information
F74 BENZO/B/FLUORANTHENE

Toxicological Information:

N/P

Section 12 - Ecological Information
F74 BENZO/B/FLUORANTHENE

Ecological Information:

N/P

Section 13 - Disposal Considerations

F74 BENZO/B/FLUORANTHENE

Waste Disposal Methods:

BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER
IAW/FEDERAL, STATE & LOCAL REGULATIONS.

Section 14 - MSDS Transport Information**F74 BENZO/B/FLUORANTHENE**

Transport Information:

N/P

Section 15 - Regulatory Information**F74 BENZO/B/FLUORANTHENE**

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

Section 16 - Other Information**F74 BENZO/B/FLUORANTHENE**

Other Information:

N/P

HAZCOM Label Information

Product Identification: F74 BENZO/B/FLUORANTHENE

CAGE: 84898

Assigned Individual: N

Company Name: CHEM SERVICE INC

Company PO Box: 3108

Company Street Address1: N/K

Company Street Address2: WEST CHESTER, PA 19381 US

Health Emergency Telephone: 215-692-3026/800-452-9994

Label Required Indicator: Y

Date Label Reviewed: 12/16/1998

Status Code: C

Manufacturer's Label Number:

Date of Label: 12/16/1998

Year Procured: N/K

Organization Code: G

Chronic Hazard Indicator: N/P

Eye Protection Indicator: N/P

Skin Protection Indicator: N/P

Respiratory Protection Indicator: N/P

Signal Word: N/P

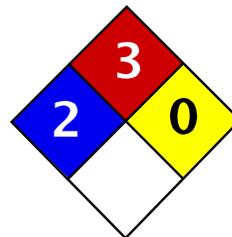
Health Hazard:

Contact Hazard:

Fire Hazard:

Reactivity Hazard:

8/8/2002 4:23:16 PM



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C₆-H₆

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.

MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].

The substance is toxic to blood, bone marrow, central nervous system (CNS).

The substance may be toxic to liver, Urinary System.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat.
Slightly flammable to flammable in presence of oxidizing materials.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire.
Reacts on contact with iodine heptafluoride gas.

Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition.
Contact with sodium peroxide with benzene causes ignition.
Benzene ignites in contact with powdered chromic anhydride.
Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States]
TWA: 1.6 STEL: 8 (mg/m³) from ACGIH (TLV) [United States]
TWA: 0.1 STEL: 1 from NIOSH
TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States]
TWA: 10 (ppm) from OSHA (PEL) [United States]
TWA: 3 (ppm) [United Kingdom (UK)]
TWA: 1.6 (mg/m³) [United Kingdom (UK)]
TWA: 1 (ppm) [Canada]
TWA: 3.2 (mg/m³) [Canada]
TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant.
(Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone.

Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion.

Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.

Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.

Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.

The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.

Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion.

Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 930 mg/kg [Rat].

Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.

MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].

Causes damage to the following organs: blood, bone marrow, central nervous system (CNS).

May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation.

Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects.

May affect genetic material (mutagenic).

May cause cancer (tumorigenic, leukemia))

Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system.

Eyes: Causes eye irritation.

Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and

other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene

California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value)

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene

Connecticut carcinogen reporting list.: Benzene

Connecticut hazardous material survey.: Benzene

Illinois toxic substances disclosure to employee act: Benzene

Illinois chemical safety act: Benzene

New York release reporting list: Benzene

Rhode Island RTK hazardous substances: Benzene

Pennsylvania RTK: Benzene

Minnesota: Benzene

Michigan critical material: Benzene

Massachusetts RTK: Benzene

Massachusetts spill list: Benzene

New Jersey: Benzene

New Jersey spill list: Benzene

Louisiana spill reporting: Benzene

California Director's list of Hazardous Substances: Benzene

TSCA 8(b) inventory: Benzene
SARA 313 toxic chemical notification and release reporting: Benzene
CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable.
R22- Harmful if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.
R62- Possible risk of impaired fertility.
S2- Keep out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S46- If swallowed, seek medical advice immediately and show this container or label.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.



HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **BERYLLIUM (DUST and POWDER)**

CAS Number: 7440-41-7

DOT Number: UN 1567 (Powder)

RTK Substance number: 0222

Date: August 1992 Revision: July 1998

HAZARD SUMMARY

- * **Beryllium dust or powder** can affect you when breathed in.
- * **Beryllium** is a CARCINOGEN--HANDLE WITH EXTREME CAUTION.
- * Breathing **Beryllium dust or powder** can irritate the nose, throat and lungs. Bronchitis and/or pneumonia may occur after high exposure.
- * Eye contact can cause irritation, itching and burning.
- * Contact with the broken skin can cause ulcers and/or lumps (nodules) to develop.
- * Exposure to **Beryllium dust or powder** can cause permanent scars to develop in the lungs.

IDENTIFICATION

Beryllium is a hard, brittle, gray-white metal. It is used in making x-ray tubes.

REASON FOR CITATION

- * **Beryllium** is on the Hazardous Substance List because it is regulated by OSHA and cited by NIOSH, ACGIH, IARC, EPA, HHAG, DOT, NFPA, NTP and DEP.
- * This chemical is on the Special Health Hazard Substance List because it is a **CARCINOGEN**.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **0.002 mg/m³** averaged over an 8-hour workshift; **0.005 mg/m³** as a ceiling limit not to be exceeded during any 15 minute period; and **0.025 mg/m³** as an acceptable maximum peak, permitted for any thirty minute period, above the ceiling limit.

NIOSH: The recommended airborne exposure limit is **0.0005 mg/m³**, which should not be exceeded at any time.

ACGIH: The recommended airborne exposure limit is **0.002 mg/m³** averaged over an 8-hour workshift and **0.01mg/m³** as a STEL (short term exposure limit).

- * **Beryllium** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

WAYS OF REDUCING EXPOSURE

- * Enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators must be worn.
- * A regulated, marked area should be established where **Beryllium dust or powder** is handled, used, or stored.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Beryllium dust or powder** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Beryllium dust or powder** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Beryllium dust or powder**:

- * Breathing **Beryllium dust or powder** can irritate the nose, throat and lungs, causing nasal discharge, tightness in the chest, cough, shortness of breath, and/or fever. Bronchitis and/or pneumonia may occur 1-2 days after high exposure, causing death in severe cases.
- * Eye contact can cause irritation, itching, and burning.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Beryllium** and can last for months or years:

Cancer Hazard

- * **Beryllium** is a PROBABLE CARCINOGEN in humans. There is some evidence that it causes lung cancer in humans and it has been shown to cause lung and bone cancer in animals.
- * Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Beryllium** has been tested and has not been shown to affect reproduction.

Other Long-Term Effects

- * Exposure to **Beryllium dust or powder** can cause permanent scars to develop in the lungs. Symptoms may include fatigue, shortness of breath, weight loss, and poor appetite. These effects may occur months or years after exposure. In severe cases disability and heart failure occur.
- * Contact with the broken skin can cause ulcers (nodules) to develop.

MEDICAL

Medical Testing

Before beginning employment and at regular times after that, for those with frequent or potentially high exposures, the following are recommended:

- * Chest x-ray.
- * Lung function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

- * Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

- * Where possible, automatically transfer **Beryllium dust or powder** from drums or other storage containers to process containers.
- * Before entering a confined space where **Beryllium dust or powder** may be present, check to make sure that an explosive concentration does not exist.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Beryllium dust or powder** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Beryllium dust or powder**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Beryllium dust or powder** immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Beryllium dust or powder** whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Beryllium** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.
- * Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP**.
- * When vacuuming, a high efficiency particulate absolute (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Beryllium dust or powder**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear dust-proof goggles and face shield when working with powders or dust, unless full facepiece respiratory protection is worn.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposure over **0.0005 mg/m³**, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- * Exposure to **4 mg/m³** is immediately dangerous to life and health. If the possibility of exposure above **4 mg/m³** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Disease and Injury Services
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Disease and Injury Services, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Material Safety Data Sheet

Benzo[k]fluoranthene, 99+% (tlc)

ACC# 54641

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[k]fluoranthene, 99+% (tlc)**Catalog Numbers:** AC279730000, AC279732500**Synonyms:** 8,9-Benzofluoranthene.**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
207-08-9	Benzo[k]fluoranthene, 99+% (TLC)	99%	205-916-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow solid.

Danger! Toxic. May be fatal if swallowed. Cancer hazard. May be fatal if absorbed through the skin. May be fatal if inhaled. Carcinogen. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. May cause lung damage.

Target Organs: Lungs, respiratory system.

Potential Health Effects

Eye: Causes eye irritation.**Skin:** Causes skin irritation. May be fatal if absorbed through the skin.**Ingestion:** May be fatal if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea.**Inhalation:** May be fatal if inhaled. Causes respiratory tract irritation.**Chronic:** May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Call a poison control center. 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: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

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. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

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

Flash Point: Not available.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: Not published.

Section 6 - Accidental Release Measures

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

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not breathe dust, vapor, mist, or gas. Do not get on skin or in eyes. Do not ingest or inhale.

Storage: Store in a cool, dry place. Store in a tightly closed container.

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.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[k]fluoranthene, 99+% (TLC)	none listed	none listed	none listed

OSHA Vacated PELs: Benzo[k]fluoranthene, 99+% (TLC): No OSHA Vacated PELs are listed for this chemical.

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: 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: Solid

Appearance: yellow

Odor: Not available.

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 480 deg C @ 760.00mm Hg

Freezing/Melting Point: 216 - 218 deg C

Decomposition Temperature: Not available.

Solubility: Not available.

Specific Gravity/Density: Not available.

Molecular Formula: C₂₀H₁₂

Molecular Weight: 252.32

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, dust generation.

Incompatibilities with Other Materials: Strong oxidants.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:

CAS# 207-08-9: DF6350000

LD50/LC50:

Not available.

Carcinogenicity:

CAS# 207-08-9:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: *Salmonella typhimurium* : 10æg/plate
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. From calc logKow of 6.84, the est bioconc factor for fish is 144. However no accum is likely due to the pres of microsomal mixed funct oxidases which enables it to be metabolised (Lyman,W.J. Handb of chem.prop est meth. Env behaviour of org chem 1982; Santodonato, J. Health and ecol assessment of polynucl arom hydrocarb. 1981) Short-necked clam cultured in artif seawater at 21-25øC for 10 days revealed a decr in benzo[k].. of ca 20% on day 8. When clams were placed in a basket and kept in harbour water, only a small incr in polycycl arom hydrocarb were found.

Environmental: When soil treated with 7 applications of oil sludge containing polynucleated arom. hydrocarb. over a two yr period, was monitored for an additional 18 months, the benzo[k] fluoranthene residue in the soil decreased by 57%. In a static biodegrad. test employing a domestic wastewater inoculum, 50-70% of benzo[k]fluoranthene residue in the soil decreased by 57%. In a static biodegrad. test employing a dometic wastewater inoculum, 50-70% of benzo[k] fluoranthene was degraded in four successive weekkly subcultures (Tabak H.H. 94th An.Mtg.Assoc.Off.Anal.Chem.1981)

Physical: No information available.

Other: Abiotic removal : Demonstrates considerable atmospheric stability. Pollution resulting from emissions can be found far from source. (Bjorseth A. Handbook of polycyclic aromatic hydrocarbons 1983, MARcel Dekker Inc., New York)

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:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 207-08-9 is not listed on the TSCA inventory. It is for research and development use only.

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

CAS# 207-08-9: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Benzo[k]fluoranthene, 99+% (TL (CAS# 207-08-9, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40

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.

CAS# 207-08-9 is listed as a Priority Pollutant under the Clean Water Act.

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# 207-08-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[k]fluoranthene, 99+% (TL, a chemical known to the state of California to cause cancer.

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:

T

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 53 Avoid exposure - obtain special instructions before use.

WGK (Water Danger/Protection)

CAS# 207-08-9: No information available.

Canada - DSL/NDSL

None of the chemicals in this product are listed on the DSL or 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

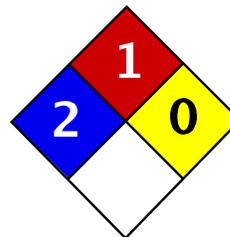
CAS# 207-08-9 is not listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information
--

MSDS Creation Date: 9/02/1997

Revision #4 Date: 10/03/2005

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.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Carbazole MSDS

Section 1: Chemical Product and Company Identification

Product Name: Carbazole

Catalog Codes: SLC4801

CAS#: 86-74-8

RTECS: FE3150000

TSCA: TSCA 8(b) inventory: Carbazole

CI#: Not available.

Synonym: 9-Azafluorene; 9H-Carbazole;
Dibenzo(b,d)pyrrole; Dibenzopyrrole; Diphenyleneimine;
Diphenylenimide; Diphenylenimine

Chemical Name: Carbazole

Chemical Formula: C12-H9-N

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Carbazole	86-74-8	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

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

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Slightly explosive in presence of open flames and sparks.
Non-explosive in presence of shocks.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

As with most organic solids, fire is possible at elevated temperatures. When heated to decomposition it emits toxic fumes of nitrogen oxides

Special Remarks on Explosion Hazards:

Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystals solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 167.21 g/mole

Color: White.

pH (1% soln/water): Not applicable.

Boiling Point: 355°C (671°F)

Melting Point: 245°C (473°F)

Critical Temperature: Not available.

Specific Gravity: Density: 1.1 @ 18 deg. C (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, acetone.

Solubility:

Partially soluble in acetone.

Very slightly soluble in diethyl ether.

Insoluble in cold water, hot water.

1 gram is soluble in 3 ml Quinoline, 6 ml Pyridine, 9 ml Acetone, 2 ml Acetone @ 50 deg. C., 35 ml Ether, 120 ml Benzene, 135 ml absolute alcohol.

Slightly soluble in Petroleum Ether, chlorinated hydrocarbons, Acetic acid, Carbon Disulfide.

Soluble in hot Chloroform, Toluene.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, dust generation

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): >5000 mg/kg [Rat].

Chronic Effects on Humans: CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC.

Other Toxic Effects on Humans:

Hazardous in case of ingestion.

Slightly hazardous in case of skin contact (irritant), of inhalation.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose:

LDL [Rat] - Route: Oral; Dose: 500 mg/kg

Lethal Dose/Conc 50% Kill:

LD50 [Mouse] - Intraperitoneal; Dose: 200 mg/kg

Lethal Dose/Conc:

LD [Mouse] - Route: Oral; Dose: >400 mg/kg

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenic).

May cause cancer based on animal test data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: May cause skin irritation.

Eyes: May cause eye irritation.

Inhalation: May cause respiratory tract irritation.

Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting and diarrhea.

Chronic Potential Health Effects:

Ingestion: Prolonged or repeated ingestion may affect the liver and cause weight loss.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

Carbazole

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Carbazole

California Director's List of Hazardous Substances: Carbazole

TSCA 8(b) inventory: Carbazole

TSCA 8(d) H and S data reporting: Carbazole: Effective date: 3/07/86; Sunset date: 3/07/96

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R40- Limited evidence of carcinogenic

effect
S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:34 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.

Methyl Chloride (R40)

Section 1. Chemical product and company identification

Product name	: Methyl Chloride (R40)
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	: Synthetic/Analytical chemistry.
Synonym	: artic; chloor-methaan (dutch); chlor-methan (german); chloromethane; chlorure de methyle (french); clorometano (italian); cloruro di metile (italian); methylchlorid (german); methyl chloride; methyl chloride (dot); metylu chlorek (polish); monochloromethane; methane, chloro-; monchloromethane
MSDS #	: 001036
Date of Preparation/Revision	: 4/10/2009.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Gas. [COLORLESS GAS WITH A FAINT, SWEET ODOR WHICH IS NOT NOTICED AT DANGEROUS CONCENTRATIONS [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]]
Emergency overview	: WARNING! FLAMMABLE GAS. MAY CAUSE FLASH FIRE. MAY BE HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CONTENTS UNDER PRESSURE. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not ingest. May cause target organ damage, based on animal data. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed. Contact with rapidly expanding gases can cause frostbite.
Target organs	: May cause damage to the following organs: kidneys, the reproductive system, liver, skin, central nervous system (CNS).
Routes of entry	: Inhalation
Potential acute health effects	
Eyes	: Contact with rapidly expanding gas may cause burns or frostbite.
Skin	: Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	: Acts as a simple asphyxiant.
Ingestion	: Ingestion is not a normal route of exposure for gases
Potential chronic health effects	: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
See toxicological information (section 11)	

Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Methyl Chloride (R40)	74-87-3	100	ACGIH TLV (United States, 1/2008). Absorbed through skin. STEL: 207 mg/m ³ 15 minute(s). STEL: 100 ppm 15 minute(s). TWA: 103 mg/m ³ 8 hour(s). TWA: 50 ppm 8 hour(s). OSHA PEL 1989 (United States, 3/1989). STEL: 210 mg/m ³ 15 minute(s). STEL: 100 ppm 15 minute(s). TWA: 105 mg/m ³ 8 hour(s). TWA: 50 ppm 8 hour(s). OSHA PEL Z2 (United States, 11/2006). AMP: 300 ppm 5 minute(s). CEIL: 200 ppm TWA: 100 ppm 8 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : 632.22°C (1170°F)
- Flash point** : Closed cup: -45.56°C (-50°F).
- Flammable limits** : Lower: 8.1% Upper: 17.2%
- Products of combustion** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides
- Fire hazards in the presence of various substances** : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.
- Fire-fighting media and instructions** : In case of fire, use water spray (fog), foam or dry chemical.

In case of fire, allow gas to burn if flow cannot be shut off immediately. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Methyl Chloride (R40)

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Do not ingest. Keep container closed. Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Storage** : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Segregate from oxidizing materials. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protection

- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

chloromethane

ACGIH TLV (United States, 1/2008). Absorbed through skin.

STEL: 207 mg/m³ 15 minute(s).

STEL: 100 ppm 15 minute(s).

TWA: 103 mg/m³ 8 hour(s).

TWA: 50 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

STEL: 210 mg/m³ 15 minute(s).

Methyl Chloride (R40)

STEL: 100 ppm 15 minute(s).
TWA: 105 mg/m³ 8 hour(s).
TWA: 50 ppm 8 hour(s).
OSHA PEL Z2 (United States, 11/2006).
AMP: 300 ppm 5 minute(s).
CEIL: 200 ppm
TWA: 100 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight	: 50.49 g/mole
Molecular formula	: C-H3-Cl
Boiling/condensation point	: -24.4°C (-11.9°F)
Melting/freezing point	: -97.8°C (-144°F)
Critical temperature	: 143.7°C (290.7°F)
Vapor pressure	: 58.7 (psig)
Vapor density	: 1.8 (Air = 1)
Specific Volume (ft³/lb)	: 7.5188
Gas Density (lb/ft³)	: 0.133

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
chloromethane	LD50 Oral	Rat	1800 mg/kg	-
	LC50 Inhalation	Rat	5300 mg/m ³	4 hours
	Vapor			
	LC50 Inhalation	Rat	5300 mg/m ³	4 hours
	Gas.			
	LC50 Inhalation	Mouse	2200 ppm	6 hours
	Gas.			

IDLH : 2000 ppm

Chronic effects on humans : **CARCINOGENIC EFFECTS:** Classified + (Proven.) by NIOSH. A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC. May cause damage to the following organs: kidneys, the reproductive system, liver, skin, central nervous system (CNS).

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects	: No known significant effects or critical hazards.
Mutagenic effects	: No known significant effects or critical hazards.
Reproduction toxicity	: No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
chloromethane	-	Acute LC50 550000 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 33 to 75 mm	96 hours
	-	Acute LC50 270000 ug/L Marine water	Fish - Inland silverside - Menidia beryllina - 40 to 100 mm	96 hours

Products of degradation : Products of degradation: carbon oxides (CO, CO₂) and water, halogenated compounds.

Environmental fate : Not available.

Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1063	METHYL CHLORIDE, OR REFRIGERANT GAS R 40	2.1	Not applicable (gas).		<p>Reportable quantity 100 lbs. (45.4 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: 5 kg</p> <p>Cargo aircraft Quantity limitation: 100 kg</p> <p>Special provisions T50</p>
TDG Classification	UN1063	METHYL CHLORIDE; OR REFRIGERANT GAS R 40	2.1	Not applicable (gas).		<p>Explosive Limit and Limited Quantity Index 0.125</p> <p>ERAP Index 3000</p>

Methyl Chloride (R40)

						Passenger Carrying Ship Index Forbidden Passenger Carrying Road or Rail Index Forbidden
Mexico Classification	UN1063	METHYL CHLORIDE, OR REFRIGERANT GAS R 40	2.1	Not applicable (gas).		-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

- U.S. Federal regulations**
- United States inventory (TSCA 8b):** This material is listed or exempted.
 - SARA 302/304/311/312 extremely hazardous substances:** No products were found.
 - SARA 302/304 emergency planning and notification:** No products were found.
 - SARA 302/304/311/312 hazardous chemicals:** chloromethane
 - SARA 311/312 MSDS distribution - chemical inventory - hazard identification:** chloromethane: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard
 - Clean Water Act (CWA) 307:** chloromethane
 - Clean Water Act (CWA) 311:** No products were found.
 - Clean Air Act (CAA) 112 accidental release prevention:** chloromethane
 - Clean Air Act (CAA) 112 regulated flammable substances:** No products were found.
 - Clean Air Act (CAA) 112 regulated toxic substances:** chloromethane

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Methyl Chloride (R40)	74-87-3	100
Supplier notification	: Methyl Chloride (R40)	74-87-3	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

- State regulations**
- Connecticut Carcinogen Reporting:** This material is not listed.
 - Connecticut Hazardous Material Survey:** This material is not listed.
 - Florida substances:** This material is not listed.
 - Illinois Chemical Safety Act:** This material is not listed.
 - Illinois Toxic Substances Disclosure to Employee Act:** This material is not listed.
 - Louisiana Reporting:** This material is not listed.
 - Louisiana Spill:** This material is not listed.
 - Massachusetts Spill:** This material is not listed.
 - Massachusetts Substances:** This material is listed.
 - Michigan Critical Material:** This material is not listed.
 - Minnesota Hazardous Substances:** This material is not listed.
 - New Jersey Hazardous Substances:** This material is listed.
 - New Jersey Spill:** This material is not listed.
 - New Jersey Toxic Catastrophe Prevention Act:** This material is not listed.
 - New York Acutely Hazardous Substances:** This material is listed.
 - New York Toxic Chemical Release Reporting:** This material is not listed.
 - Pennsylvania RTK Hazardous Substances:** This material is listed.
 - Rhode Island Hazardous Substances:** This material is not listed.

Methyl Chloride (R40)

California Prop. 65 : **WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Methyl Chloride (R40)	No.	Yes.	No.	No.

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.
Class B-6: Reactive flammable material
Class D-2A: Material causing other toxic effects (Very toxic).
CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

United States

Label requirements : FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY BE HARMFUL IF SWALLOWED.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

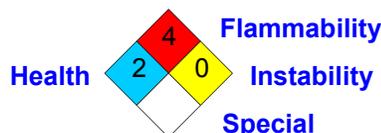
Canada

Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.
Class B-6: Reactive flammable material
Class D-2A: Material causing other toxic effects (Very toxic).

Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		4
Physical hazards		0

National Fire Protection Association (U.S.A.)



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CHROMIUM**

CAS Number: 7440-47-3

DOT Number: None

RTK Substance number: 0432

Date: April 1994

Revision: January 2000

HAZARD SUMMARY

- * **Chromium** can affect you when breathed in.
- * Exposure to **Chromium fumes** can cause "metal fume fever." This is a flu-like illness with symptoms of metallic taste, fever and chills, aches, chest tightness and cough.
- * **Chromium** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * **Chromium ore** has been reported to cause lung allergy. Once allergy develops, even small future exposure may cause coughing, wheezing or shortness of breath.

IDENTIFICATION

Chromium is a steel-gray, lustrous metal or a metallic grey powder. It is used in stainless and alloy steels, refractory products, tanning agents for leather, pigments, electroplating, catalysts, and corrosion-resistant products.

REASON FOR CITATION

- * **Chromium** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, NIOSH, DEP and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

- OSHA: The legal airborne permissible exposure limit (PEL) is **1 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.5 mg/m³** averaged over a 10-hour workshift.
- ACGIH: The recommended airborne exposure limit is **0.5 mg/m³** averaged over an 8-hour workshift.

- * **Chromium** may form metal fumes which present different hazards than the substance itself.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Chromium** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Chromium** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in “hot” operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chromium**:

- * Exposure to **Chromium fumes** can cause “*metal fume fever*.” This is a flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chromium** and can last for months or years:

Cancer Hazard

- * There is no evidence that **Chromium metal** is a CARCINOGEN. Roasting of *Chromite ore* is suspected of having CARCINOGENIC potential.

Reproductive Hazard

- * There is no evidence that **Chromium** affects reproduction. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

Other Long-Term Effects

- * **Chromium** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- * *Chromite ore* has been reported to cause lung allergy. Once allergy develops, even small future exposure may cause coughing, wheezing, or shortness of breath.

MEDICAL

Medical Testing

For those with frequent or potentially high exposure (half the TLV or greater), the following are recommended before beginning work and at regular times after that:

- * Lung function tests. These may be normal if the person is not having an attack at the time of the test.

If symptoms develop or overexposure is suspected, the following is recommended:

- * Evaluation by a qualified allergist, including careful exposure history and special testing, may help diagnose skin allergy.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer **Chromium** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Chromium** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Chromium**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Chromium**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Chromium**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Chromium** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * Use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Chromium**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear impact resistant eye protection with side shields or goggles.
- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- * If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Chromium**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- * Exposure to **250 mg/m³** is immediately dangerous to life and health. If the possibility of exposure above **250 mg/m³** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **CHRYSENE**

CAS Number: 218-01-9
DOT Number: None

RTK Substance number: 0441
Date: April 1994 Revision: December 1999

HAZARD SUMMARY

- * **Chrysene** can affect you when breathed in and by passing through your skin.
- * If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect and permanent changes in skin pigment can occur.
- * **Chrysene** is almost always found in *Coal Tar Pitch, Coal Tar Creosote*, or other coal tar products. If you work with coal, tar, soot, pitch, asphalt, etc., you may be exposed to **Chrysene**.
- * *CONSULT THE NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES HAZARDOUS SUBSTANCE FACT SHEETS ON COAL TAR PITCH AND COAL TAR CREOSOTE.*

IDENTIFICATION

Pure **Chrysene** is a colorless to off-white flake which is used in laboratories and dye manufacturing. **Chrysene** is most often found in black or brown tars and pitches.

REASON FOR CITATION

- * **Chrysene** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, HHAG and EPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.

- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

The following exposure limits are for *Coal Tar Pitch Volatiles*:

- OSHA: The legal airborne permissible exposure limit (PEL) is **0.2 mg/m³** averaged over an 8-hour workshift.
- NIOSH: The recommended airborne exposure limit is **0.1 mg/m³** averaged over a 10-hour workshift.
- ACGIH: An exposure limit has not been determined for this suspected carcinogen. Worker exposure by all routes should be carefully controlled to the lowest possible level.

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Chrysene** and at the end of the workshift.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Chrysene** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Chrysene**:

- * If skin contaminated with **Chrysene** is exposed to sunlight, a rash or sunburn effect can occur, sometimes with blisters.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chrysene** and can last for months or years:

Cancer Hazard

- * There is limited evidence that **Chrysene** causes cancer in animals. It may cause skin cancer.
- * Many scientists believe there is no safe level of exposure to a carcinogen. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Chrysene** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * Permanent changes in skin pigment can occur if contaminated skin is exposed to sunlight.

MEDICAL

Medical Testing

- * There is no special test for this chemical. However, monthly, carefully look at any skin areas that have been exposed. Any growth (like a mole) that increases in size or shows changes in color should be examined by a physician. Skin cancer is curable when detected early.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

- * Sunlight exposure on skin contaminated with *Coal Tar* chemicals can cause rash and later, pigment changes. Persons who smoke cigarettes may be at increased risk for lung cancer with his chemical. This can be significantly reduced by stopping smoking as well as by reducing exposures.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer pure **Chrysene** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Chrysene** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Chrysene**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Chrysene**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Chrysene**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Chrysene** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * For pure **Chrysene** use a vacuum or a wet method to reduce dust during clean-up. **DO NOT DRY SWEEP.**

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Chrysene**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * For pure **Chrysene** wear impact resistant eye protection with side shields or goggles.
- * Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposure over **0.1 mg/m³**, (as *Coal Tar Pitch Volatiles*) use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- * Exposure to **80 mg/m³** (as *Coal Tar Pitch Volatiles*) is immediately dangerous to life and health. If the possibility of exposure above **80 mg/m³** (as *Coal Tar Pitch Volatiles*) exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.
- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.
- Q: Don't all chemicals cause cancer?
- A: No. Most chemicals tested by scientists are not cancer-causing.
- Q: Should I be concerned if a chemical causes cancer in animals?
- A: Yes. Most scientists agree that a chemical that causes cancer in animals should be treated as a suspected human carcinogen unless proven otherwise.
- Q: But don't they test animals using much higher levels of a chemical than people usually are exposed to?
- A: Yes. That's so effects can be seen more clearly using fewer animals. But high doses alone don't cause cancer unless it's a cancer agent. In fact, a chemical that causes cancer in animals at high doses could cause cancer in humans exposed to low doses.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

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

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.



[Division of Facilities Services](#)

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

101/102/110 COPPER/COPPER ALLOYS

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
101/102/110 COPPER/COPPER ALLOYS**

Product Identification: 101/102/110 COPPER/COPPER ALLOYS

Date of MSDS: 09/01/1989 **Technical Review Date:** 08/18/1993

FSC: 3439 **NIIN:** LIIN: 00F029170

Submitter: F BT

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: ANSONIA COPPER & BRASS INC
Post Office Box: 109
Manufacturer's Address1: 75 LIBERTY ST
Manufacturer's Address2: ANSONIA, CT 06401
Manufacturer's Country: US
General Information Telephone: 203-732-6600/800-521-17038
Emergency Telephone: 203-732-6600/800-521-1703
Emergency Telephone: 203-732-6600/800-521-1703
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 40518
Special Project Code: N

Preparer Information

Preparer's Name: ANSONIA COPPER & BRASS INC
Preparer's Address1: 75 LIBERTY ST
Preparer's Address2: ANSONIA, CT 06401
Preparer's CAGE: 40518
Assigned Individual: N

Contractor Information

Contractor's Name: ANSONIA COPPER & BRASS INC
Contractor's Address1: 75 LIBERTY ST
Contractor's Address2: ANSONIA, CT 06401
Contractor's Telephone: 203-732-6600/800-521-17038
Contractor's CAGE: 40518

Section 2 - Compositon/Information on Ingredients 101/102/110 COPPER/COPPER ALLOYS

Ingredient Name: COPPER (DUST & MIST), BRONZE POWDER
Ingredient CAS Number: 7440-50-8 **Ingredient CAS Code:** M
RTECS Number: GL5325000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: 100
% Enviromental Weight:

Other REC Limits: 1 MG(CU)/M3 (DUST)
OSHA PEL: 0.1 MG(CU)/M3 (FUME) **OSHA PEL Code:** M
OSHA STEL: **OSHA STEL Code:**
ACGIH TLV: 0.2 MG/M3 (FUME) **ACGIH TLV Code:** M
ACGIH STEL: N/P **ACGIH STEL Code:**
EPA Reporting Quantity: 5000 LBS
DOT Reporting Quantity: 5000 LBS
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview

101/102/110 COPPER/COPPER ALLOYS

Health Hazards Acute & Chronic: RESPIRATORY TRACT IRRITATION, METAL FUME FEVER, EYE IRRITATION. LEAD INTOXICATION INCLUDING KIDNEY DISEASE, ANEMIA, NERVOUS DISORDERS, REPRODUCTIVE EFFECTS, BIRTH DEFECTS & KIDNEY CANCER. COPPER FUMES CAUSES METAL FUME FEVER, SKIN/HAIR DISCOLORATION, KERATINIZATION OF HANDS/FEET SOLES, & RESPIRATORY TRACT IRRITATION.

Signs & Symptoms of Overexposure:

METAL FUME FEVER SYMPTOMS INCLUDE: SWEET OR METALLIC TASTE IN MOUTH, DRYNESS & IRRITATION OF THROAT, COUGH, SHORTNESS OF BREATH, CHEST PAIN, NAUSEA, VOMITING, WEAKNESS, FATIGUE, MUSCLE & JOINT PAIN, C HILLS, SWEATING & FEVER. COPPER: METALLIC TASTE IN MOUTH & NAUSEA. SEE SUPP.

Medical Conditions Aggravated by Exposure:

N/K

LD50 LC50 Mixture: N/K

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcenogenicity Indicators

NTP: NO

IARC: NO

OSHA: NO

Carcinogenicity Explanation: NONE

Section 4 - First Aid Measures

101/102/110 COPPER/COPPER ALLOYS

First Aid:

EYES: FLUSH W/WATER. SKIN: VACUUM OFF EXCESS DUST. WASH W/SOAP & WATER. INHALATION: REMOVE TO FRESH AIR. METAL FUME FEVER MAY BE TREATED SYMPTOMATICALLY. INGESTION: OBTAIN MEDICAL ATTENTION IF LARGE Q UANTITIES HAVE BEEN INGESTED. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Section 5 - Fire Fighting Measures

101/102/110 COPPER/COPPER ALLOYS

Fire Fighting Procedures:

SOLID MASSIVE FORM ISN'T COMBUSTIBLE. WEAR SELF-CONTAINED BREATHING APPARATUS & PROTECTIVE CLOTHING. WHEN IN DUST FORM USE DRY CHEMICAL/SAND.

Unusual Fire or Explosion Hazard:

FIRE & EXPLOSION HAZARDS ARE MODERATE WHEN MATERIAL IS IN THE FORM OF DUST & EXPOSED TO HEAT, FLAMES, CHEMICAL REACTION OR IN CONTACT W/POWDERFUL OXIDIZERS.

Extinguishing Media:

N/K

Flash Point: Flash Point Text: N/R

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/R

Upper Limit(s): N/R

Section 6 - Accidental Release Measures

101/102/110 COPPER/COPPER ALLOYS

Spill Release Procedures:

LARGE QUANTITIES OF DUST: VACUUM/WET SWEEP. LIQUIDS W/SOLID METAL: EVACUATE AREA. ABSORB W/VERMICULATE/DRY SAND/SIMILAR MATERIAL.

Section 7 - Handling and Storage

101/102/110 COPPER/COPPER ALLOYS

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection

101/102/110 COPPER/COPPER ALLOYS

Respiratory Protection:

USE NIOSH/OSHA APPROVED RESPIRATORY PROTECTION IF EXPOSURE EXCEEDS THE PEL/TLV LIMITS.

Ventilation:

LOCAL EXHAUST/MECHANICAL (GENERAL): REQUIRED IF DUST/FUME CREATED IN HANDLING OR WORKING ON THIS MATERIAL

Protective Gloves:

REQUIRED FOR MELT/GRIND/CUT/WELD JOBS

Eye Protection: SAFETY GLASSES W/SIDE SHIELDS

Other Protective Equipment: GRINDING OPERATIONS MAY REQUIRED FACE SHIELDS. MELTING/WELDING REQUIRE FACE SHIELDS W/SPECIALTY TINTED GLASS.

Work Hygienic Practices: USE GOOD PERSONAL HYGIENE. WASH HANDS BEFORE

EATING/DRINKING/SMOKING/LEAVING WORK AFTER CONTACT W/METAL DUST OR FUME.

Supplemental Health & Safety Information: UNDER NORMAL CONDITIONS THE SOLID ALLOY PRESENTS NO SIGNIFICANT HEALTH HAZARDS. PROCESSING OF THE ALLOY BY DUST/FUME PRODUCING OPERATION (GRINDING/BUFFING/HEATING/WELDING) MAY RESULT IN POTENTIAL FOR EXPOSURE TO AIRBORNE METAL PARTICULATES/FUME.

Section 9 - Physical & Chemical Properties
101/102/110 COPPER/COPPER ALLOYS

HCC:

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: N/R

Melting/Freezing Point: Melting/Freezing Text: 1500-2260F

Decomposition Point: Decomposition Text: N/K

Vapor Pressure: N/R Vapor Density: N/R

Percent Volatile Organic Content:

Specific Gravity: 7.4-9

Volatile Organic Content Pounds per Gallon:

pH: N/K

Volatile Organic Content Grams per Liter:

Viscosity: N/P

Evaporation Weight and Reference: N/R

Solubility in Water: INSOLUBLE

Appearance and Odor: SILVER OR YELLOW TO RED SOLID

Percent Volatiles by Volume: N/K

Corrosion Rate: N/K

Section 10 - Stability & Reactivity Data
101/102/110 COPPER/COPPER ALLOYS

Stability Indicator: YES

Materials to Avoid:

STRONG ACIDS, BASES & OXIDERS. MAY REACT VIOLENTLY W/WATER. MERCURY, AMMONIA & ACETYLENE.

Stability Condition to Avoid:

HEAT, FLAMES

Hazardous Decomposition Products:

METAL FUME

Hazardous Polymerization Indicator: NO

Conditions to Avoid Polymerization:

N/K

Section 11 - Toxicological Information
101/102/110 COPPER/COPPER ALLOYS

Toxicological Information:

N/P

Section 12 - Ecological Information
101/102/110 COPPER/COPPER ALLOYS

Ecological Information:N/P

Section 13 - Disposal Considerations
101/102/110 COPPER/COPPER ALLOYS

Waste Disposal Methods:

MAXIMIZE PRODUCT RECOVERY FOR REUSE OR RECYCLING. CONDITIONS MAY CAUSE THIS MATERIAL TO BECOME A SOLID HAZARDOUS WASTE. SOLID WASTE LEACHATE TESTING MAY INDICATE THE NEED FOR PROPERLY PERMITTED DISPOSAL IN ACCORDANCE W/FEDERAL, STATE, & LOCAL LAWS.

Section 14 - MSDS Transport Information
101/102/110 COPPER/COPPER ALLOYS

Transport Information:N/P

Section 15 - Regulatory Information
101/102/110 COPPER/COPPER ALLOYS

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:N/P

Section 16 - Other Information
101/102/110 COPPER/COPPER ALLOYS

Other Information:

N/P

HAZCOM Label Information**Product Identification:** 101/102/110 COPPER/COPPER ALLOYS**CAGE:** 40518**Assigned Individual:** N**Company Name:** ANSONIA COPPER & BRASS INC**Company PO Box:****Company Street Address1:** 75 LIBERTY ST**Company Street Address2:** ANSONIA, CT 06401 US**Health Emergency Telephone:** 203-732-6600/800-521-1703**Label Required Indicator:** N**Date Label Reviewed:** 08/18/1993**Status Code:** C**Manufacturer's Label Number:** N/R**Date of Label:** 08/18/1993**Year Procured:** N/K**Organization Code:** N**Chronic Hazard Indicator:** N/P**Eye Protection Indicator:** N/P

Skin Protection Indicator: N/P

Respiratory Protection Indicator: N/P

Signal Word: N/P

Health Hazard:

Contact Hazard:

Fire Hazard:

Reactivity Hazard:

8/8/2002 3:59:36 PM

SUPELCO INC -- 48574, DIBENZO (A,H) ANTHRACENE 0.1G -- 6810-00N032523

===== Product Identification =====

Product ID:48574, DIBENZO (A,H) ANTHRACENE 0.1G

MSDS Date:12/19/1985

FSC:6810

NIIN:00N032523

MSDS Number: BNSSL

=== Responsible Party ===

Company Name:SUPELCO INC

Address:SUPELCO PARK

City:BELLEFONTE

State:PA

ZIP:16823-0048

Country:US

Info Phone Num:814-359-3441

Emergency Phone Num:814-359-3441

CAGE:54968

=== Contractor Identification ===

Company Name:SIGMA-ALDRICH INC.

Address:3050 SPRUCE STREET

Box:14508

City:ST. LOUIS

State:MO

ZIP:63103

Country:US

Phone:314-771-5765/414-273-3850X5996

CAGE:54968

===== Composition/Information on Ingredients =====

Ingred Name:DIBENZ A,H ANTHRACENE

CAS:53-70-3

RTECS #:HN2625000

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.

Routes of Entry: Inhalation:YES Skin:NO Ingestion:YES

Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO

Health Hazards Acute and Chronic:REPORTED ANIMAL CARCINOGEN.

Explanation of Carcinogenicity:DIBENZ(A,H) ANTHRACENE: GROUP 2A(IARC),
ANTICIPATED TO BE CARCINOGEN (NTP).

Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.

Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures =====

First Aid:EYES: FLUSH WITH WATER FOR AT LEAST 15 MIN. CONTACT A
PHYSICIAN. SKIN: FLUSH WITH LARGE VOLUMES OF WATER. CONTACT A
PHYSICIAN. INHAL: IMMED MOVE TO FRESH AIR. INGEST: CONTACT A
PHYSICIAN.

===== Fire Fighting Measures =====

Lower Limits:1%

Extinguishing Media:WATER, CO2, DRY CHEMICAL.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .

===== Accidental Release Measures =====

Spill Release Procedures:SWEEP UP MATERIAL. AVOID GENERATING DUST.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL, DRY
LOCATION. AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD. AVOID EYE OR SKIN CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:WEAR NIOSH/MSHA APPROVED SCBA.
Ventilation:USE ONLY IN WELL VENTILATED AREA.
Protective Gloves:IMPERVIOUS GLOVES .
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

===== Physical/Chemical Properties =====

HCC:T6
Boiling Pt:B.P. Text:509F,265C
Vapor Density:9.60
Spec Gravity:>1(H2O=1)
Appearance and Odor:OFF-WHITE TO YELLOW-GREEN CRYSTALLINE

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.

===== Disposal Considerations =====

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR
LOCAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department
of Defense. The United States of America in no manner whatsoever,
expressly or implied, warrants this information to be accurate and
disclaims all liability for its use. Any person utilizing this
document should seek competent professional advice to verify and
assume responsibility for the suitability of this information to their
particular situation.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Dieldrin
Product Number : D7519
Brand : Sigma
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene
Formula : C₁₂H₈Cl₆O
Molecular Weight : 380.92 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Dieldrin			
60-57-1	200-484-5	602-049-00-9	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Toxic by skin absorption

Target Organs

Central nervous system, Liver, Blood

HMIS Classification

Health Hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Skin	Toxic if absorbed through skin. May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up

Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling

Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage

Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis
------------	---------	-------	---------	--------	-------

			parameters		
Dieldrin	60-57-1	TWA	0.25 mg/m ³	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Liver damage Central Nervous System convulsion Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories. Danger of cutaneous absorption				
		TWA	0.25 mg/m ³	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
	Skin notation				
		TWA	0.25 mg/m ³	2007-01-01	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Skin designation				

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves.

Eye protection

Face shield and safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form solid

Safety data

pH no data available
Melting point 143.0 - 144.0 °C (289.4 - 291.2 °F)
Boiling point no data available
Flash point no data available

Ignition temperature no data available
Lower explosion limit no data available
Upper explosion limit no data available
Water solubility no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - mouse - 38.0 mg/kg

LD50 Oral - dog - 65.0 mg/kg

LD50 Oral - Monkey - 3.0 mg/kg

LD50 Oral - rabbit - 45.0 mg/kg

LD50 Oral - Pig - 38.0 mg/kg

LD50 Oral - guinea pig - 49.0 mg/kg

LD50 Oral - Hamster - 60.0 mg/kg

LD50 Oral - Pigeon - 23.7 mg/kg

LD50 Oral - Chicken - 20.0 mg/kg

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Miosis (pupillary constriction). Behavioral:Excitement. Behavioral:Food intake (animal).

LD50 Oral - Quail - 10.8 mg/kg

Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Irritability.

LD50 Oral - Duck - 381.0 mg/kg

LD50 Oral - Mammal - 94.0 mg/kg

Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold.

LD50 Oral - Bird (wild) - 13.3 mg/kg

LDLO Oral - rat - 30.0 mg/kg

Remarks: Liver:Other changes.

LDLO Oral - Human - male - 65.0 mg/kg

LDLO Oral - cat - 500 mg/kg

Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - rat - 140 mg/kg

Remarks: Liver:Other changes. Blood:Other changes. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Other esterases.

TDLo Oral - rat - 109 mg/kg

Remarks: Liver:Changes in liver weight.

TDLo Oral - rat - 88 mg/kg

Remarks: Behavioral:Food intake (animal). Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Phosphatases.

LC50 Inhalation - rat - 4 h - 13.0 mg/m³

LD50 Dermal - rabbit - 250.0 mg/kg

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dieldrin)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Potential Health Effects

Inhalation	May be fatal if inhaled. May cause respiratory tract irritation.
Skin	Toxic if absorbed through skin. May cause skin irritation. May be fatal if absorbed through skin.
Eyes	May cause eye irritation.
Ingestion	May be fatal if swallowed.
Target Organs	Central nervous system, Liver, Blood,

Additional Information

RTECS: IO1750000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	mortality LC50 - Carassius auratus (goldfish) - 1.6 µg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - 79.5 µg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Marine pollutant: No

IATA

UN-Number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic n.o.s. (Dieldrin)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards

Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Toxic by skin absorption

DSL Status

This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
Dieldrin	60-57-1

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known in the State of California to cause cancer.
Dieldrin

CAS-No.
60-57-1

Revision Date
1990-06-15

16. OTHER INFORMATION**Further information**

Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

PHIBRO ENERGY USA, INC. -- DIESEL FUEL -- 9140-00-000-0184

===== Product Identification =====

Product ID:DIESEL FUEL
MSDS Date:01/31/1994
FSC:9140
NIIN:00-000-0184
MSDS Number: BVGFN
=== Responsible Party ===
Company Name:PHIBRO ENERGY USA, INC.
Address:500 DALLAS AVE, SUITE 3200
City:HOUSTON
State:TX
ZIP:77002
Country:US
Info Phone Num:713-646-5135
Emergency Phone Num:713-923-6641, CHEMTREC 800-424-9300
Preparer's Name:SUE BOTTOM
CAGE:0V310

=== Contractor Identification ===
Company Name:PHIBRO ENERGY USA INC
Address:500 DALLAS AVE SUITE 3200
Box:City:HOUSTON
State:TX
ZIP:77002
Country:US
Phone:713-923-6641, CHEMTREC800-424-9300
CAGE:0V310

===== Composition/Information on Ingredients =====

Ingred Name:PETROLEUM DISTILLATE, ALIPHATIC AND AROMATIC HYDROCARBONS
(VARYING FROM C9 TO C20), CONTAING ALSO INGREDIENT #2 TO 7.

Fraction by Wt: BALANCE
Other REC Limits:NONE SPECIFIED
OSHA PEL:400 PPM NAPHTHA TWA

Ingred Name:N-OCTANE
CAS:111-65-9
RTECS #:RG8400000
Fraction by Wt: <1-2%
Other REC Limits:NONE SPECIFIED
OSHA PEL:300 PPM TWA 1989
ACGIH TLV:300 PPM/375STEL;9394

Ingred Name:N-NONANE
CAS:111-84-2
RTECS #:RA6115000
Fraction by Wt: <1-3%
Other REC Limits:NONE SPECIFIED
OSHA PEL:200 PPM
ACGIH TLV:200 PPM; 9192

Ingred Name:NAPHTHALENE (SARA III)
CAS:91-20-3
RTECS #:QJ0525000
Fraction by Wt: <1-3%
Other REC Limits:NONE RECOMMENDED

OSHA PEL:10 PPM
 ACGIH TLV:10 PPM/15 STEL; 9394
 EPA Rpt Qty:100 LBS
 DOT Rpt Qty:100 LBS

Ingred Name:HEXANE ISOMERS (OTHER THAN N-HEXANE)
 Fraction by Wt: <1-3%
 Other REC Limits:NONE RECOMMENDED
 OSHA PEL:500 PPM
 ACGIH TLV:500 PPM

Ingred Name:N-HEXANE
 CAS:110-54-3
 RTECS #:MN9275000
 Fraction by Wt: <1-2%
 Other REC Limits:NONE RECOMMENDED
 OSHA PEL:50 PPM 1989
 ACGIH TLV:50 PPM; 9394
 EPA Rpt Qty:1 LB
 DOT Rpt Qty:1 LB

Ingred Name:N-HEPTANE
 CAS:142-82-5
 RTECS #:MI7700000
 Fraction by Wt: <1-2%
 Other REC Limits:NONE RECOMMENDED
 OSHA PEL:400 PPM TWA 1989
 ACGIH TLV:400 PPM/500STEL;9394

Ingred Name:HYDROGEN SULFIDE (SARA III)
 CAS:7783-06-4
 RTECS #:MX1225000
 Other REC Limits:NONE RECOMMENDED
 OSHA PEL:C, 20 PPM
 ACGIH TLV:10 PPM/15 STEL; 9394
 EPA Rpt Qty:100 LBS
 DOT Rpt Qty:100 LBS

=====
 ===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
 Health Hazards Acute and Chronic:ACUTE-INHALATION:CNS EFFECTS,
 RESPIRATORY IRRITATION. EYES:SEVERE IRRITATION. INGESTION:HARMFUL
 OR FATAL, IRRITATION OF GI TRACT. ASPIRATION INTO THE LUNGS CAN
 CAUSE SEVERE CHEMICAL PNEUMONITIS, WHICH CAN BE FATAL.
 SKIN:REPEATED EXPOSURE MAY CAUSE IRRITATION. CHRONIC:DERMATITIS.
 TARGET ORGANS:SKIN, LUNG, CNS.
 Explanation of Carcinogenicity:PER NIOSH BULLETIN 50 A POTENTIAL
 OCCUPATIONAL CARCINOGENIC HAZARD EXISTS DUE TO HUMAN EXPOSURE TO
 DIESEL EXHAUST.
 Effects of Overexposure:EYE:IRRITATION, REDNESS, TEARING, BLURRED
 VISION, CONJUNCTIVITIS. SKIN:IRRITATION, DRYNESS, REDNESS, ITCHING.
 INHAL:HEADACHE, DIZZINESS, DROWZINESS, NAUSEA, VOMITNING, TREMORS,
 CONVULSIONS, IRREGULAR H EART BEAT. INGESTION: G/I IRRITATION AND
 SYMPTOMS SIMILAR TO INHALATION.
 Medical Cond Aggravated by Exposure:EYE, SKIN, HEART, CNS, AND
 RESPIRATORY DISORDERS MAY BE AGGARAVATED BY OVEREXPOSURE.

=====
 ===== First Aid Measures =====

First Aid:SKIN:REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER.
GET MEDICAL ATTENTION IF IRRITATION PERSISTS. INHALATION:REMOVE TO
FRESH AIR & RESTORE BREATHING IF NECESSARY. GET MEDICAL ATTENTION.
EYE:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES WHILE HOLDING
EYELIDS OPEN. GET MEDICAL ATTENTION. INGESTION:GET IMMEDIATE
MEDICAL ATTENTION. DO NOT INDUCE VOMITING. NOTHING BY MOUTH IF
UNCONSCIOUS.

=====
Fire Fighting Measures
=====

Flash Point:125F,52C
Lower Limits:0.4%
Upper Limits:8.0%
Extinguishing Media:CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
Fire Fighting Procedures:EVACUATE AREA. USE NIOSH APPROVED SCBA & FULL
PROTECTIVE EQUIPMENT TO FIGHT FIRE. USE WATER SPRAY TO COOL EXPOSED
CONTAINERS. DIRECT WATER SPRAY MAY SPREAD FIRE
Unusual Fire/Explosion Hazard:VAPORS ARE HEAVIER THAN AIR AND MAY
TRAVEL ALONG GROUND OR FLOOR, THEN 'FLASH BACK' FROM A DISTANT
IGNITION SOURCE. TOXIC FUMES & GASES ARE PRODUCED BY FIRE.

=====
Accidental Release Measures
=====

Spill Release Procedures:EVACUATE AREA. WEAR PROTECTIVE EQUIPMENT. SHUT
OFF SOURCE IF POSSIBLE & CONTAIN SPILL. REMOVE IGNITION SOURCES.
KEEP OUT OF WATER RESOURCES AND SEWERS. ABSORB IN INERT MATERIAL OR
RECOVER BY PUMPING. TRANSFER TO DISPOSAL DRUMS.
Neutralizing Agent:NONE

=====
Handling and Storage
=====

Handling and Storage Precautions:KEEP AWAY FROM HEAT, SPARKS, FLAME.
STORE IN WELL VENTILATED AREA. GROUND CONTAINERS DURING TRANSFER.
STORE IN CLOSED CONTAINER.
Other Precautions:EMPTY CONTAINERS RETAIN RESIDUE. DO NOT PRESSURIZE,
CUT, WELD OR EXPOSE TO HEAT, FLAME, STATIC ELECTRICITY, OR OTHER
SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY.

=====
Exposure Controls/Personal Protection
=====

Respiratory Protection:FOR CONCENTRATIONS EXCEEDING RECOMMENDED LEVEL,
USE NIOSH/MSHA APPROVED AIR PURIFYING RESPIRATOR. FOR SPILL OR IF
CONCENTRATION IS UNKNOWN, USE NIOSH/MSHA SUPPLIED AIR RESPIRATOR OR
SCBA.
Ventilation:GENERAL OR MECHANICAL
Protective Gloves:NEOPRENE OR NITRILE
Eye Protection:SAFETY GLASSES OR CHEMICAL SPLASH GOGGLE
Other Protective Equipment:PROTECTIVE GARMENTS TO PREVENT SKIN CONTACT.
Work Hygienic Practices:DO NOT EAT, DRINK OR SMOKE WHILE WORKING WITH
THIS PRODUCT.
Supplemental Safety and Health
DANGER! UNTREATED PRODUCT MAY CONTAIN OR RELEASE HYDROGEN SULFIDE. H2S
IS A HIGHLY TOXIC AND FLAMMABLE GAS WHICH CAN BE FATAL IF INHALED
AT CERTAIN CONCENTRATION.

=====
Physical/Chemical Properties
=====

HCC:F4
NRC/State Lic Num:NONE

Boiling Pt:B.P. Text:325F,163C
Vapor Pres:<0.1 PSI
Vapor Density:3-7
Spec Gravity:0.84 - 0.93
Viscosity:8 CST @ -4F
Solubility in Water:NEGLIGIBLE
Appearance and Odor:CLEAR TO STRAW COLORED LIQUID, KEROSENE ODOR.
Percent Volatiles by Volume:NEGLIG

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
STRONG OXIDIZING AGENTS, STRONG ACIDS, CAUSTICS AND HALOGENS.
Stability Condition to Avoid:OPEN FLAMES, SOURCES OF IGNITION, STATIC
ELECTRICITY.
Hazardous Decomposition Products:CARBON MONOXIDE, CARBON DIOXIDE AND
REACTIVE HYDROCARBONS (LDEHYDES, AROMATICS, ETC) COMPOUNDS.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND
FEDERAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department
of Defense. The United States of America in no manner whatsoever,
expressly or implied, warrants this information to be accurate and
disclaims all liability for its use. Any person utilizing this
document should seek competent professional advice to verify and
assume responsibility for the suitability of this information to their
particular situation.



[Division of Facilities Services](#)

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

ETHYLBENZENE, 251C-6

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
ETHYLBENZENE, 251C-6**

Product Identification: ETHYLBENZENE, 251C-6

Date of MSDS: 03/01/1992 **Technical Review Date:** 11/13/1995

FSC: 6810 **NIIN:** LIIN: 00N047370

Submitter: N EN

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: POLYSCIENCE
Manufacturer's Address1: 7800 MERRIMAC AVE
Manufacturer's Address2: NILES, IL 60648
Manufacturer's Country: US
General Information Telephone: 312-956-0611
Emergency Telephone: 312-965-0611
Emergency Telephone: 312-965-0611
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: N
Published: Y
CAGE: IO526
Special Project Code: N

Contractor Information

Contractor's Name: POLYSCIENCE
Contractor's Address1: 7800 MERRIMAC AVE
Contractor's Address2: NILES, IL 60714
Contractor's Telephone: 708-965-0611
Contractor's CAGE: IO526

Contractor Information

Contractor's Name: POLYSCIENCE CORP
Post Office Box: 48312
Contractor's Address1: 7800 N MERRIMAC AVE
Contractor's Address2: NILES, IL 60714-3426
Contractor's Telephone: 708-965-0611
Contractor's CAGE: 58378

Section 2 - Compositon/Information on Ingredients
ETHYLBENZENE, 251C-6

Ingredient Name: BENZENE, ETHYL-; (ETHYLBENZENE) (SARA III)
Ingredient CAS Number: 100-41-4 **Ingredient CAS Code:** M
RTECS Number: DA0700000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: N/K
% Enviromental Weight:

Other REC Limits: N/K
OSHA PEL: 100 PPM; 125 STEL **OSHA PEL Code:** M
OSHA STEL: **OSHA STEL Code:**
ACGIH TLV: 100 PPM; 125 STEL **ACGIH TLV Code:** M
ACGIH STEL: N/P **ACGIH STEL Code:**
EPA Reporting Quantity: 1000 LBS
DOT Reporting Quantity: 1000 LBS
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview ETHYLBENZENE, 251C-6

Health Hazards Acute & Chronic: ACUTE: MAY BE HARMFUL BY INHALATION, INGESTION OR SKIN ABSORPTION. CAUSES SKIN IRRITATION. VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES & UPPER RESPIRATORY TRACT. CAN CAUSE CNS DEPRESSION . EXPOSURE CAN CAUSE NAUSEA, HEADACHE & VOMITING. TARGET ORGAN:CNS.

Signs & Symptoms of Overexposure:
SEE HEALTH HAZARDS.

Medical Conditions Aggravated by Exposure:
NONE SPECIFIED BY MANUFACTURER.

LD50 LC50 Mixture: LD50: (ORAL, RAT): 3500 MG/KG

Route of Entry Indicators:
Inhalation: YES
Skin: YES
Ingestion: YES

Carcinogenicity Indicators
NTP: NO
IARC: NO
OSHA: NO

Carcinogenicity Explanation: NOT RELEVANT

Section 4 - First Aid Measures ETHYLBENZENE, 251C-6

First Aid:
EYES: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN: IMMEDIATELY FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING & SHOES. INHAL: REMOVE TO FRESH AIR. INGEST: WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL MD. WASH CONTAMINATED CLOTHING BEFORE REUSE.

Section 5 - Fire Fighting Measures ETHYLBENZENE, 251C-6

Fire Fighting Procedures:

USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N). USE WATER SPRAY TO COOL FIRE-EXPOSED CONTAINERS. WARNING:FLAMMABLE LIQUID.

Unusual Fire or Explosion Hazard:

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION & FLASH BACK. CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.

Extinguishing Media:

CARBON DIOXIDE, DRY CHEMICAL POWDER/APPROP FOAM. WATER MAY BE EFTIVE FOR COOLING, BUT MAY NOT EFFECT EXTINGUISHMENT.

Flash Point: Flash Point Text: 72.0F,22.2C

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): 1%

Upper Limit(s): 6.7%

Section 6 - Accidental Release Measures
ETHYLBENZENE, 251C-6

Spill Release Procedures:

EVACUATE AREA. SHUT OFF ALL SOURCES OF IGNIT. WEAR NIOSH/MSHA APPRVD SCBA, RUB BOOTS & HEAVY RUB GLOVES. USE NONSPK TOOLS. COVER W/ACTIVATED CARBON ABSORB, TAKE UP & PLACE IN CLSD CNTNRS. TRANSPORT OU TDOORS. VENT AREA & WASH SPILL SITE AFTER (SUPDAT)

Section 7 - Handling and Storage
ETHYLBENZENE, 251C-6

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection
ETHYLBENZENE, 251C-6

Respiratory Protection:

NIOSH/MSHA APPROVED RESPIRATOR.

Ventilation:

MECHANICAL EXHAUST REQUIRED.

Protective Gloves:

RUBBER GLOVES.

Eye Protection: ANSI APPRVD CHEM WORKER GOGGLES (FP N).

Other Protective Equipment: WEAR SUITABLE PROTECTIVE CLOTHING. ANSI APPRV SAFETY SHOWER & EYE BATH.

Work Hygenic Practices: DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. WASH THOROUGHLY AFTER HANDLING.

Supplemental Health & Safety Information: VP:10 @ 20C, 19 @ 37.7C. SPILL PROC:MATERIAL PICKUP IS COMPLETE.

Section 9 - Physical & Chemical Properties
ETHYLBENZENE, 251C-6

HCC: F3
NRC/State License Number:
Net Property Weight for Ammo:
Boiling Point: Boiling Point Text: 277F,136C
Melting/Freezing Point: Melting/Freezing Text: -139F,-95C
Decomposition Point: Decomposition Text: N/K
Vapor Pressure: SUPDAT Vapor Density: 3.7
Percent Volatile Organic Content:
Specific Gravity: 0.867
Volatile Organic Content Pounds per Gallon:
pH: N/K
Volatile Organic Content Grams per Liter:
Viscosity: N/P
Evaporation Weight and Reference: N/K
Solubility in Water: N/K
Appearance and Odor: COLORLESS LIQUID.
Percent Volatiles by Volume: N/K
Corrosion Rate: N/K

Section 10 - Stability & Reactivity Data
ETHYLBENZENE, 251C-6

Stability Indicator: YES
Materials to Avoid:
OXIDIZING AGENTS.
Stability Condition to Avoid:
NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:
TOXIC FUMES OF: CARBON MONOXIDE, CARBON DIOXIDE.
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NOT RELEVANT

Section 11 - Toxicological Information
ETHYLBENZENE, 251C-6

Toxicological Information:
N/P

Section 12 - Ecological Information
ETHYLBENZENE, 251C-6

Ecological Information:
N/P

Section 13 - Disposal Considerations
ETHYLBENZENE, 251C-6

Waste Disposal Methods:

BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER & SCRUBBER BUT EXERT EXTRA CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE. OBSERVE ALL FEDERAL, STATE & LOCAL LAWS.

Section 14 - MSDS Transport Information
ETHYLBENZENE, 251C-6

Transport Information:
N/P

Section 15 - Regulatory Information
ETHYLBENZENE, 251C-6

SARA Title III Information:
N/P
Federal Regulatory Information:
N/P
State Regulatory Information:
N/P

Section 16 - Other Information
ETHYLBENZENE, 251C-6

Other Information:
N/P

HAZCOM Label Information

Product Identification: ETHYLBENZENE, 251C-6
CAGE: IO526
Assigned Individual: Y
Company Name: POLYSCIENCE
Company PO Box:
Company Street Address1: 7800 MERRIMAC AVE
Company Street Address2: NILES, IL 60714 US
Health Emergency Telephone: 312-965-0611
Label Required Indicator: Y
Date Label Reviewed: 01/11/1994
Status Code: C
Manufacturer's Label Number:
Date of Label: 01/11/1994
Year Procured: N/K
Organization Code: G
Chronic Hazard Indicator: N
Eye Protection Indicator: YES
Skin Protection Indicator: YES
Respiratory Protection Indicator: YES
Signal Word: DANGER
Health Hazard: Moderate
Contact Hazard: Slight
Fire Hazard: Severe
Reactivity Hazard: None

8/9/2002 8:26:14 AM



Information in this format is provided as a service to our customers and is intended only for their use. Others may use it at their own discretion and risk.

The MSDS format adheres to U.S. standards and regulatory requirements and may not meet regulatory requirements in other locations.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience are gained. Please return to this website for the most current version.

"FREON" 11

2090FR

Revised 19-OCT-1996

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"FREON" is a registered trademark of DuPont.

Corporate MSDS Number : DU000026
CAS Number : 75-69-4
Formula : CCl₃F
Molecular Weight : 137.36

Tradenames and Synonyms

F-11
CC0119

Company Identification

MANUFACTURER/DISTRIBUTOR

DuPont Fluoroproducts
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.
302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S.)

703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S.
302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*METHANE, TRICHLOROFLUORO- ("FREON" 11)	75-69-4	100

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Causes skin and eye irritation.

HUMAN HEALTH EFFECTS:

Human health effects of overexposure by eye contact may include eye irritation with discomfort, tearing, or blurring of vision. Skin contact with the liquid may cause drying of the skin with repeated contact resulting in mild skin irritation with discomfort or rash. Overexposure by inhalation may cause temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness; temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation, or the effects of exclusion of oxygen with grossly excessive exposures. Ingestion may include nonspecific discomfort, such as nausea, headache, or weakness.

Individuals with preexisting diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of excessive exposures.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

In case of skin contact, flush skin with plenty of water for 15 minutes. Get medical attention if irritation is present.

EYE CONTACT

In case of eye contact, immediately flush eyes with plenty of water for 15 minutes. Call a physician.

INGESTION

If swallowed, no specific intervention is indicated as the compound is not likely to be hazardous by ingestion. However, consult a physician if necessary.

Notes to Physicians

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution in situations of emergency life support.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : Will not burn
Method : TOC
Flammable limits in Air, % by Volume
LEL : Not applicable
UEL : Not applicable
Autoignition : Not determined
Autodecomposition : >593 C (>1099 F)

Fire and Explosion Hazards:

Drums may rupture under fire conditions. Decomposition may occur.

Extinguishing Media

As appropriate for combustibles in area.

Fire Fighting Instructions

Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are spilled under fire conditions. Water runoff should be contained and

neutralized prior to release.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Ventilate area. Do not flush into sewers. Dike spill. Collect on absorbent material and transfer to steel drums for recovery or disposal. Use self-contained breathing apparatus (SCBA) for large spills. Comply with Federal, State and local regulations on reporting releases.

HANDLING AND STORAGE

Handling (Personnel)

Use with sufficient ventilation to keep employee exposure below recommended limits.

Storage

Clean, dry area. Do not store above 125 deg F (52 deg C).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal Protective Equipment

Impervious gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a spill occurs.

Exposure Guidelines

Exposure Limits
"FREON" 11

PEL (OSHA) : 1,000 ppm, 5,600 mg/m³, 8 Hr. TWA
TLV (ACGIH) : Ceiling 1,000 ppm, 5,620 mg/m³, A4
AEL * (DuPont) : None Established

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point : 23.9 C (75 F)
Vapor Pressure : 14.7 psia at 25 deg C (77 deg F)
Vapor Density : 4.9 (Air = 1)
% Volatiles : 100 WT%
Evaporation Rate : (CCl₄ = 1)
Greater than 1
Solubility in Water : 0.1 WT% @ 25 C (77 F)
pH : Neutral
Odor : Slight ethereal
Form : Liquid
Color : Colorless
Density : 1.48 g/cc at 25 deg C (77 deg F)
Appearance : Clear

STABILITY AND REACTIVITY

Chemical Stability

Stable.

However, avoid open flames and high temperatures.

Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals- powdered Al, Zn, Be, etc.

Decomposition

Decomposition products are hazardous. Freon 11 can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides. These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

Inhalation 4-hour LC50: 26,200 ppm in rats
Oral ALD : 3725 mg/kg in rats

The compound is not a skin irritant but is a mild eye irritant. Toxic effects in rats exposed by inhalation include central nervous system and anesthetic effects at high concentrations. Concentrations of 0.35% and higher caused cardiac sensitization in dogs. Various cardiovascular and circulatory abnormalities have also been reported in other animals. Changes in the lungs, liver, brain and spleen were observed in a study of rats exposed by inhalation to 12 times the TLV. In another study at 25 times the TLV, rats, guinea pigs, and cats exhibited no microscopic evidence of damage to the heart, lungs, kidney, liver or spleen. Exposures by ingestion or skin resulted in no evidence of toxicity in rats, dogs or rabbits.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

"FREON" 11: 96-hour LC50, rainbow trout: 190 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Reclaim by distillation or remove to a permitted waste disposal facility. Comply with Federal, State, and local regulations.

TRANSPORTATION INFORMATION

Shipping Information

DOT

DOT/IMO

Proper Shipping Name : RQ ENVIRONMENTALLY HAZARDOUS SUBSTANCE
LIQUID, N.O.S.
(TRICHLOROFLUOROMETHANE)

Hazard Class : 9

UN No. : 3082

DOT/IMO Label : CLASS 9

Packing Group : III

Shipping Containers

Tank Cars.

Tank Trucks.

Drums.

Reportable Quantity : 5000 lb

NOT REGULATED AS A HAZARDOUS MATERIAL BY DOT, IMO OR ICAO IN CONTAINERS LESS THAN 5000 LBS.

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes

Chronic : No

Fire : No

Reactivity : No

Pressure : No

HAZARDOUS CHEMICAL LISTS

SARA Extremely

Hazardous Substance - No

CERCLA Hazardous Substance - Yes

SARA Toxic Chemical - See Components Section

Superfund reportable discharge = 5000 lb.

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating

Health : 1

Flammability : 0

Reactivity : 1

Personal Protection rating to be supplied by user depending on use conditions.

Additional Information

"FREON" 11 contains very low levels of carbon tetrachloride and chloroform, chemicals known to the State of California to cause cancer.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : MSDS Coordinator
> : DuPont Fluoroproducts
Address : Wilmington, DE 19898
Telephone : (800) 441-7515

Indicates updated section.

End of MSDS



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont
Material Safety Data Sheet

Page 1

2022FR "FREON" 12
Revised 19-APR-2004

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"FREON" is a registered trademark of DuPont.

Corporate MSDS Number : DU001065
Formula : CC12F2

Tradenames and Synonyms

CC0112

Company Identification

MANUFACTURER/DISTRIBUTOR

DuPont Fluoroproducts
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.
302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S.
703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S.
302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*METHANE, DICHLORODIFLUORO- ("FREON" 12)	75-71-8	100

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

Skin contact with liquid may include frostbite or mild skin irritation with discomfort. Significant skin permeation, and systemic toxicity, after contact appears unlikely. The compound has been infrequently associated with skin sensitization in humans.

(HAZARDS IDENTIFICATION - Continued)

Eye contact with the liquid or high vapor concentrations may include irritation with discomfort, tearing, or blurring of vision.

Higher exposures may cause irritation of the upper respiratory passages, with coughing and discomfort; temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness; temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross overexposure may cause fatality.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

In case of contact, flush skin with water. Treat for frostbite if necessary by gently warming affected area.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Ingestion is not considered a potential route of exposure.

Notes to Physicians

Because of a possible disturbance of cardiac rhythm, catecholamine drugs, such as epinephrine, should only be used with special caution in situations of emergency life support.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : Will not burn
Flammable limits in Air, % by Volume
LEL : Not applicable
UEL : Not applicable
Autoignition : >750 C (>1382 F)

Fire and Explosion Hazards:

Cylinders may rupture under fire conditions. Decomposition may occur.

Extinguishing Media

As appropriate for combustibles in area.

Fire Fighting Instructions

Use water spray or fog to cool containers. Self-contained breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. Water runoff should be contained and neutralized prior to release.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Ventilate area, especially low or enclosed places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills.

HANDLING AND STORAGE

Handling (Personnel)

Use with sufficient ventilation to keep employee exposure below recommended limits.

Storage

Clean, dry area. Do not heat above 52 deg C (125 deg F).

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal Protective Equipment

Impervious gloves and chemical splash goggles should be used when handling liquid. Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines

Applicable Exposure Limits

METHANE, DICHLORODIFLUORO- ("FREON" 12)
PEL (OSHA) : 1,000 ppm, 4,950 mg/m³, 8 Hr. TWA
TLV (ACGIH) : 1,000 ppm, 4,950 mg/m³, 8 Hr. TWA, A4
AEL * (DuPont) : None Established

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point : -29.8 C (-21.6 F)
Vapor Pressure : 94.5 psia at 25 deg C (77 deg F)
Vapor Density : 4.26 (Air = 1.0)
 at 25 deg C (77 deg F)
% Volatiles : 100 WT%
Solubility in Water : 0.028 WT% @ 25 C (77 F) at 1 atm
pH : Neutral
Odor : Slight ethereal
Form : Liquified gas
Color : Clear, colorless
Density : 1.315 g/cc at 25 deg C (77 deg F) -
 Liquid

STABILITY AND REACTIVITY

Chemical Stability

Material is stable. However, avoid open flames and high temperatures.

Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals- powdered Al, Zn, Be, etc.

Decomposition

Decomposition products are hazardous. "Freon" 12 can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides. These materials are toxic and irritating. Contact should be avoided.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

Inhalation 30 minute LC50: 800,000 ppm in rats
Oral ALD: >1000 mg/kg in rats

No significant irritation was seen when a mixture containing CFC-12 was sprayed onto the skin and eyes of animals. This material is untested for animal sensitization.

Effects in animals from single high exposure by inhalation include anesthesia and irregular heartbeat (cardiac arrhythmias) due to the heart being made more sensitive to adrenalin (cardiac sensitization). Repeated high exposures caused tremors, incoordination, reduced reflexes and altered respiratory function. Long-term studies showed no significant clinical, blood chemistry, or pathological effects following repeated or long term exposures.

Effects in animals from repeated or long-term ingestion of this material include slight alterations in blood chemistry and body weight gain. No other clinical, biochemical or pathological signs of toxicity have been observed.

Tests in animals demonstrate no carcinogenic activity and no developmental or reproductive toxicity. The compound does not produce heritable genetic damage in animals or genetic damage in bacterial and mammalian cell cultures.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

48 hour EC50 - Daphnia magna: 95 mg/L
-----DISPOSAL CONSIDERATIONS

Waste Disposal

Comply with Federal, State, and local regulations.
Reclaim by distillation or remove to a permitted waste
facility.
-----TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : DICHLORODIFLUOROMETHANE
Hazard Class : 2.2
UN No. : 1028
DOT/IMO Label : NONFLAMMABLE GAS

Shipping Containers

Tank Cars.

Cylinders
Ton Tanks
Reportable Quantity : 5,000 lbs./2,270 kg.
-----REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : Yes

HAZARDOUS CHEMICAL LISTS

SARA Extremely
Hazardous Substance - No

(REGULATORY INFORMATION - Continued)

CERCLA Hazardous Substance - Yes
SARA Toxic Chemical - See Components Section

Superfund reportable discharge = 5000 lb.

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating
Health : 1
Flammability : 0
Reactivity : 1

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : MSDS Coordinator
> : DuPont Fluoroproducts
Address : Wilmington, DE 19898
Telephone : (800) 441-7515

Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

BELMONT METALS INC -- MERCURY -- 9650-00-537-7929

===== Product Identification =====

Product ID:MERCURY
 MSDS Date:08/03/1989
 FSC:9650
 NIIN:00-537-7929
 MSDS Number: BWXRF
 === Responsible Party ===
 Company Name:BELMONT METALS INC
 Address:330 BELMONT AVE
 City:BROOKLYN
 State:NY
 ZIP:11207-4010
 Country:US
 Info Phone Num:718-342-4900
 Emergency Phone Num:718-342-4900
 Preparer's Name:BRUCE N REED
 CAGE:70774
 === Contractor Identification ===
 Company Name:BELMONT METALS INC
 Address:330 BELMONT AVE
 Box:City:BROOKLYN
 State:NY
 ZIP:11207
 Phone:718-342-4900
 CAGE:70774

===== Composition/Information on Ingredients =====

Ingred Name:MERCURY, QUICKSILVER (IARC CANCER REVIEW GROUP 3) *94-4*
 CAS:7439-97-6
 RTECS #:OV4550000
 Fraction by Wt: 99.99%
 Other REC Limits:INORGANIC 0.1 MG/CUM
 OSHA PEL:0.1 MG/CUM
 ACGIH TLV:0.01 MG/CUM (SKIN)
 EPA Rpt Qty:1 LB
 DOT Rpt Qty:1 LB

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
 Health Hazards Acute and Chronic:CHRONIC MERCURY POISONING RESULTS IN
 NERVOUS IRRITABILITY, WEAKNESS, TREMOR, GINGIVITIS, ERETHISM,
 GREYING OF LENS OF EYE.
 Explanation of Carcinogenicity:NONE
 Effects of Overexposure:CHRONIC MERCURY POISONING RESULTS IN NERVOUS
 IRRITABILITY, WEAKNESS, TREMOR, GINGIVITIS, ERETHISM, GREYING OF
 LENS OF EYE.

===== First Aid Measures =====

First Aid:INHALATION: REMOVE TO FRESH AIR. INGESTION: INDUCE VOMITING.
 EYES/SKIN: FLUSH W/WATER. OBTAIN MEDICAL ATTENTION IN ALL CASES.

===== Fire Fighting Measures =====

Fire Fighting Procedures:WEAR DUST MASK W/CARTRIDGE FOR MERCURY VAPOR.
 Unusual Fire/Explosion Hazard:HIGH TEMPS INCREASE VAPORIZATION OF
 MERCURY.

===== Accidental Release Measures =====

Spill Release Procedures:SWEEP AREA TO REMOVE AS MUCH AS POSSIBLE.
 VACUUM AREA USING SPECIAL MERCURY VACUUM CLEANER.

===== Handling and Storage =====

Handling and Storage Precautions:STORE IN CLOSED CONTAINERS IN WELL
 VENTILATED COOL PLACES AWAY FROM AREAS OF HIGH TEMPS/ACUTE FIRE
 HAZARDS.

Other Precautions:AVOID INHALATION OF VAPORS/INGESTION. DON'T SMOKE/EAT
 IN IMMEDIATE AREA OF USE/STORAGE.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:WEAR A DUST MASK W/CARTRIDGE FOR MERCURY VAPOR.

Ventilation:LOCAL EXHAUST INCLUDING FLOOR LEVEL.

Protective Gloves:RUBBER/OTHER IMPERVIOUS

Eye Protection:SAFETY GLASSES

Other Protective Equipment:SHOWERS, PROTECTIVE CLOTHING

Work Hygienic Practices:REMOVE/LAUNDRER CONTAMINATED CLOTHING BEFORE
 REUSE. WASH THOROUGHLY AFTER HANDLING.

Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:676F

Melt/Freeze Pt:M.P/F.P Text:-39F

Vapor Pres:0.0012

Vapor Density:>1

Spec Gravity:13.55

Evaporation Rate & Reference:SLOWER THAN ETHER

Appearance and Odor:SILVERY LIQUID AT 70F.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES

HALOGENS, NITRIC ACID

Stability Condition to Avoid:HIGH TEMPS

===== Disposal Considerations =====

Waste Disposal Methods:RETURN TO SUPPLIER IAW/FEDERAL, STATE & LOCAL
 REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
 This information is formulated for use by elements of the Department
 of Defense. The United States of America in no manner whatsoever,
 expressly or implied, warrants this information to be accurate and
 disclaims all liability for its use. Any person utilizing this
 document should seek competent professional advice to verify and
 assume responsibility for the suitability of this information to their
 particular situation.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Indeno[1,2,3-c,d]pyrene solution

Product Number : 36947
Brand : Fluka

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Cyclohexane			
110-82-7	203-806-2	601-017-00-1	>= 99 %
Indeno[1,2,3-cd]pyrene			
193-39-5	205-893-2	-	0.013 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable liquid

Target Organs

Lungs, Central nervous system

HMIS Classification

Health hazard: 1

Flammability: 3

Physical hazards: 0

NFPA Rating

Health hazard: 1

Fire: 3

Reactivity Hazard: 0

Potential Health Effects

Inhalation

May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point -18 °C (0 °F)

Ignition temperature no data available

Suitable extinguishing media

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

Recommended storage temperature: 2 - 8 °C

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Update	Basis
Cyclohexane	110-82-7	TWA	100 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Central Nervous System impairment				
		TWA	300 ppm 1,050 mg/m ³	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	300 ppm 1,050 mg/m ³	2006-02-28	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m ³ is approximate.				

Personal protective equipment**Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

For prolonged or repeated contact use protective gloves.

Eye protection

Face shield and safety glasses

Skin and body protection

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form liquid

Safety data

pH no data available

Melting point 6.5 °C (43.7 °F)

Boiling point	79 - 81 °C (174 - 178 °F) at 1,013 hPa (760 mmHg)
Flash point	-18 °C (0 °F)
Ignition temperature	no data available
Lower explosion limit	1.2 %(V)
Upper explosion limit	8.3 %(V)
Density	0.780 g/cm ³
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability

Stable under recommended storage conditions.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous reactions

Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Central nervous system depression, Drowsiness, Irritability, Dizziness, Lung irritation, chest pain, pulmonary edema, Gastrointestinal disturbance

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Target Organs	Lungs, Central nervous system,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

no data available

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 1145 Class: 3 Packing group: II
 Proper shipping name: Cyclohexane
 Reportable Quantity (RQ): 1000 lbs
 Marine pollutant: No
 Poison Inhalation Hazard: No

IMDG

UN-Number: 1145 Class: 3 Packing group: II EMS-No: F-E, S-D
 Proper shipping name: CYCLOHEXANE
 Marine pollutant: No

IATA

UN-Number: 1145 Class: 3 Packing group: II
 Proper shipping name: Cyclohexane

15. REGULATORY INFORMATION

OSHA Hazards

Flammable liquid

DSL Status

This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

Indeno[1,2,3-cd]pyrene

CAS-No.
193-39-5

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01
Indeno[1,2,3-cd]pyrene	193-39-5	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer.	193-39-5	2007-09-28
Indeno[1,2,3-cd]pyrene		

16. OTHER INFORMATION**Further information**

Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.



**Material Safety
Data Sheets**

Division of Facilities Services

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

14253 IRON 25 MG/L AS IRON

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Compositon/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
14253 IRON 25 MG/L AS IRON**

Product Identification: 14253 IRON 25 MG/L AS IRON

Date of MSDS: 05/10/1990 **Technical Review Date:** 09/05/1991

FSC: 6810 **NIIN:** LIIN: 00F018312

Submitter: F BT

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: HACH COMPANY
Post Office Box: 907
Manufacturer's Address1: N/K
Manufacturer's Address2: AMES, IA 50010
Manufacturer's Country: NK
General Information Telephone: (800) 227-4224
Emergency Telephone: (800) 227-4224
Emergency Telephone: (800) 227-4224
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 4T252
Special Project Code: N

Preparer Information

Preparer's Name: HACH COMPANY
Post Office Box: 907
Preparer's Address1: 100 DAYTON RD.
Preparer's Address2: AMES, IA 50010
Preparer's CAGE: 4T252
Assigned Individual: N

Contractor Information

Contractor's Name: HACH CO
Post Office Box: 389
Contractor's Address1: 5600 LINDBERGH DR
Contractor's Address2: LOVELAND, CO 80539-8902
Contractor's Telephone: 970-669-3050/800-227-4224
Contractor's CAGE: 91224

Contractor Information

Contractor's Name: HACH COMPANY
Post Office Box: 907
Contractor's Address1: 100 DAYTON RD.
Contractor's Address2: AMES, IA 50010
Contractor's Telephone: 800-227-4224
Contractor's CAGE: 4T252

Section 2 - Composition/Information on Ingredients
14253 IRON 25 MG/L AS IRON

Ingredient Name: FERROUS CHLORIDE (SARA III)
Ingredient CAS Number: 7758-94-3 **Ingredient CAS Code:** M
RTECS Number: NO5400000 **RTECS Code:** M
=WT: =WT Code:

=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: <0.1%
% Enviromental Weight:
Other REC Limits: N/K
OSHA PEL: 1 MG FE/M3 OSHA PEL Code: M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: 1 MG FE/M3; 9192 ACGIH TLV Code: M
ACGIH STEL: N/P ACGIH STEL Code:
EPA Reporting Quantity: 100 LBS
DOT Reporting Quantity: 100 LBS
Ozone Depleting Chemical: N

Ingredient Name: HYDROGEN CHLORIDE (HYDROCHLORIC ACID) (SARA III)
Ingredient CAS Number: 7647-01-0 Ingredient CAS Code: M
RTECS Number: MW4025000 RTECS Code: M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: <0.1%
% Enviromental Weight:
Other REC Limits: 7 PPM
OSHA PEL: C 5 PPM OSHA PEL Code: M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: C 5 PPM; 9192 ACGIH TLV Code: M
ACGIH STEL: N/P ACGIH STEL Code:
EPA Reporting Quantity: 5000 LBS
DOT Reporting Quantity: 5000 LBS
Ozone Depleting Chemical: N

Ingredient Name: WATER, H2O
Ingredient CAS Number: 7732-18-5 Ingredient CAS Code: M
RTECS Number: ZC0110000 RTECS Code: M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:

<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: <100%
% Enviromental Weight:
Other REC Limits: N/K
OSHA PEL: N/K OSHA PEL Code: M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: N/K ACGIH TLV Code: M
ACGIH STEL: N/P ACGIH STEL Code:
EPA Reporting Quantity:
DOT Reporting Quantity:
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview
14253 IRON 25 MG/L AS IRON

Health Hazards Acute & Chronic: SKIN/EYES: IRRITATION. PRACTICALLY NON-TOXIC.

Signs & Symptoms of Overexposure:
SKIN/EYES: IRRITATION. PRACTICALLY NON-TOXIC.

Medical Conditions Aggravated by Exposure:
N/K

LD50 LC50 Mixture: N/K

Route of Entry Indicators:
Inhalation: NO
Skin: YES
Ingestion: NO

Carcenogenicity Indicators
NTP: NO
IARC: NO
OSHA: NO

Carcinogenicity Explanation: NONE

Section 4 - First Aid Measures
14253 IRON 25 MG/L AS IRON

First Aid:
EYES/SKIN: FLUSH W/PLENTY OF WATER. INGESTION: GIVE LARGE QUANTITIES OF WATER OR MILK. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Section 5 - Fire Fighting Measures

14253 IRON 25 MG/L AS IRON

Fire Fighting Procedures:

N/R

Unusual Fire or Explosion Hazard:

N/K

Extinguishing Media:

N/R

Flash Point: Flash Point Text: N/R**Autoignition Temperature:****Autoignition Temperature Text:** N/A**Lower Limit(s):** N/R**Upper Limit(s):** N/R

Section 6 - Accidental Release Measures
14253 IRON 25 MG/L AS IRON

Spill Release Procedures:

COVER CONTAMINATED SURFACES W/SODA ASH OR SODIUM BICARBONATE. MIX & ADD WATER IF NECESSARY. USE LITMUS PAPER TO MAKE SURE PH OF SLURRY IS NEUTRAL OR ADD NEUTRALIZER UNTIL MIXTURE STOPS BUBBLING. SCOOP UP THE SLURRY/WASH DOWN THE DRAIN W/EXCESS WATER.

Section 7 - Handling and Storage
14253 IRON 25 MG/L AS IRON

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection
14253 IRON 25 MG/L AS IRON

Respiratory Protection:

N/K

Ventilation:

ADEQUATE

Protective Gloves:

DISPOSABLE

Eye Protection: SAFETY GLASSES**Other Protective Equipment:** N/K**Work Hygienic Practices:** WASH THOROUGHLY AFTER HANDLING.**Supplemental Health & Safety Information:** METAL CORROSIVITY: ALUMINUM: 0.078 IN/YR. STEEL 0.123 IN/YR.

Section 9 - Physical & Chemical Properties
14253 IRON 25 MG/L AS IRON

HCC:

NRC/State License Number:
Net Property Weight for Ammo:
Boiling Point: Boiling Point Text: 212F
Melting/Freezing Point: Melting/Freezing Text: N/R
Decomposition Point: Decomposition Text: N/K
Vapor Pressure: N/K Vapor Density: N/K
Percent Volatile Organic Content:
Specific Gravity: 0.99
Volatile Organic Content Pounds per Gallon:
pH: 1.1
Volatile Organic Content Grams per Liter:
Viscosity: N/P
Evaporation Weight and Reference: N/K
Solubility in Water: MISCIBLE
Appearance and Odor: CLEAR, COLORLESS, LIQUID
Percent Volatiles by Volume: N/K
Corrosion Rate: SEE SUPP

Section 10 - Stability & Reactivity Data
14253 IRON 25 MG/L AS IRON

Stability Indicator: YES
Materials to Avoid:
HYDROXIDES
Stability Condition to Avoid:
HEAT, EVAPORATION
Hazardous Decomposition Products:
N/R
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
N/K

Section 11 - Toxicological Information
14253 IRON 25 MG/L AS IRON

Toxicological Information:
N/P

Section 12 - Ecological Information
14253 IRON 25 MG/L AS IRON

Ecological Information:
N/P

Section 13 - Disposal Considerations
14253 IRON 25 MG/L AS IRON

Waste Disposal Methods:
DISPOSE OF IN ACCORDANCE W/LOCAL, STATE, & FEDERAL REGULATIONS.

Section 14 - MSDS Transport Information
14253 IRON 25 MG/L AS IRON

Transport Information:N/P

Section 15 - Regulatory Information**14253 IRON 25 MG/L AS IRON**

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:N/P

Section 16 - Other Information**14253 IRON 25 MG/L AS IRON**

Other Information:

N/P

HAZCOM Label Information**Product Identification:** 14253 IRON 25 MG/L AS IRON**CAGE:** 4T252**Assigned Individual:** N**Company Name:** HACH COMPANY**Company PO Box:** 907**Company Street Address1:** 100 DAYTON RD.**Company Street Address2:** AMES, IA 50010 US**Health Emergency Telephone:** (800) 227-4224**Label Required Indicator:** Y**Date Label Reviewed:** 12/16/1998**Status Code:** C**Manufacturer's Label Number:****Date of Label:** 12/16/1998**Year Procured:** N/K**Organization Code:** G**Chronic Hazard Indicator:** N/P**Eye Protection Indicator:** N/P**Skin Protection Indicator:** N/P**Respiratory Protection Indicator:** N/P**Signal Word:** N/P**Health Hazard:****Contact Hazard:****Fire Hazard:****Reactivity Hazard:**

8/8/2002 8:32:51 AM

SCOTT SPECIALTY GASES -- ISOBUTYLENE IN AIR -- 6665-01-214-8247

===== Product Identification =====

Product ID:ISOBUTYLENE IN AIR
 MSDS Date:04/23/1992
 FSC:6665
 NIIN:01-214-8247
 MSDS Number: BVRGC
 === Responsible Party ===
 Company Name:SCOTT SPECIALTY GASES
 Address:ROUTE 611 NORTH
 City:PLUMSTEADVILLE
 State:PA
 ZIP:18949
 Country:US
 Info Phone Num:215-766-8861
 Emergency Phone Num:215-766-8861; 908-754-7700
 CAGE:51847

=== Contractor Identification ===

Company Name:SCOTT SPECIALTY GASES
 Address:6141 EASTON RD (6141 ROUTE 611)
 Box:310
 City:PLUMSTEADVILLE
 State:PA
 ZIP:18934
 Country:US
 Phone:215-766-8861/ FAX: 215-766-0416
 CAGE:51847

===== Composition/Information on Ingredients =====

Ingred Name:PROPENE, 2-METHYL-; (ISOBUTYLENE)
 CAS:115-11-7
 RTECS #:UD0890000
 OSHA PEL:N/K
 ACGIH TLV:N/K

Ingred Name:AIR, REFRIGERATED LIQUID; AIR COMPRESSED (UN1002, DOT); AIR
 REFRIGERATED LIQUID (CRYOGENIC LIQUID) (UN1003) (DOT)
 RTECS #:AX5271000
 OSHA PEL:N/K
 ACGIH TLV:N/K

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
 Routes of Entry: Inhalation:YES Skin:NO Ingestion:NO
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
 Health Hazards Acute and Chronic:ACUTE:CONCENTRATION OF ISOBUTYLENE IS
 THIS MIXTURE SHOULD NOT PRESENT ANY SYMPTOMS OF TOXICITY.
 CHRONIC:NONE.
 Explanation of Carcinogenicity:NOT RELEVANT
 Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.
 Medical Cond Aggravated by Exposure:NONE.

===== First Aid Measures =====

First Aid:INGEST:CALL MD IMMEDIATELY . EYES:IMMEDIATELY FLUSH W/POTABLE

WATER FOR A MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD .
SKIN:FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD . INHAL:IMME DIATELY
REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

=====
===== Fire Fighting Measures =====

Flash Point:NONFLAMMABLE
Extinguishing Media:USE WHAT IS APPROPRIATE FOR SURROUNDING FIRE.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE
EQUIPMENT . USE WATER SPRAY TO KEEP FIRE EXPOSED CYLINDERS COOL.
Unusual Fire/Explosion Hazard:COMPRESSED AIR AT HIGH PRESSURES WILL
ACCELERATE THE BURNING OF FLAMMABLE MATERIALS.

=====
===== Accidental Release Measures =====

Spill Release Procedures:EVACUATE & VENTILATE AREA. REMOVE LEAKING
CYLINDER TO EXHAUST HOOD OR SAFE OUTDOORS AREA IF THIS CAN BE DONE
SAFELY.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
===== Handling and Storage =====

Handling and Storage Precautions:STORE IN WELL VENTILATED AREAS ONLY.
KEEP VALVE PROT CAP ON CYLS WHEN NOT IN USE & SECURE CYL WHEN USING
TO PROT FROM FALLING.
Other Precautions:USE SUITABLE HAND TRUCK TO MOVE CYLS. PROT CYLS FROM
PHYSICAL DMG. DO NOT DEFACE CYLS/LBLS. MOVE CYL W/ADEQ HAND TRUCK.
CYL SHOULD BE REFILLED BY QUALIFIED PRODUCERS OF COMPRESSED GAS.
SHIPMENT OF COM PRESSED GAS CYL WHICH HAS NOT (SUPDAT)

=====
===== Exposure Controls/Personal Protection =====

Respiratory Protection:USE NIOSH/MSHA APPROVED SCBA IN CASE OF
EMERGENCY OR NON-ROUTINE USE.
Ventilation:PROVIDE ADEQUATE GENERAL & LOCAL EXHAUST VENTILATION.
Protective Gloves:RUBBER GLOVES.
Eye Protection:ANSI APPROVED CHEM WORKERS GOGGS .
Other Protective Equipment:WEAR SAFETY SHOES. A SAFETY SHOWER & EYEWASH
STATION SHOULD BE READILY AVAILABLE.
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
OTHER PREC:BEEN FILLED BY OWNER OR WITH HIS WRITTEN CONSENT IS A
VIOLATION OF FEDERAL LAW (49 CFR).

=====
===== Physical/Chemical Properties =====

HCC:G3
Boiling Pt:B.P. Text:-318F,-194C
Vapor Density:1.2
Spec Gravity:0.88 (H*20=1)
Solubility in Water:INSOLUBLE
Appearance and Odor:COLORLESS GAS W/POSSIBLE SLIGHT OLEFINIC ODOR.
Percent Volatiles by Volume:100

=====
===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
NONE.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.

Hazardous Decomposition Products:NONE.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS . RETURN CYLS TO SUPPLIER FOR PROPER DISP W/ANY VALVE OUTLET PLUGS/CAPS SECURED & VALVE PROT CAP IN PLACE. ALLOW GAS TO DISCHARGE AT SLO W RATE TO ATM IN UNCONFINED AREA/EXHST HOOD.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.



New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **MAGNESIUM**

CAS Number: 7439-95-4
DOT Number: UN 1869
UN 1418 (powder)

RTK Substance number: 1136
Date: January 1986 Revision: September 1999

HAZARD SUMMARY

- * **Magnesium dust or fume** can affect you when breathed in.
- * Contact can irritate the skin and eyes.
- * Breathing **Magnesium dust** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.
- * Repeated exposure to the *dust* can cause **Magnesium** to accumulate in the body. This will cause an upset stomach.

IDENTIFICATION

Magnesium is a light, silvery-white metal. It is an essential trace element. It is used in making structural parts, diecast auto parts, missiles, precision instruments, optical mirrors, flash bulbs and flares, pyrotechnics, and batteries.

REASON FOR CITATION

- * **Magnesium** is on the Hazardous Substance List because it is cited by DOT and NFPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

No occupational exposure limits have been established for **Magnesium**. This does not mean that this substance is not harmful. Safe work practices should always be followed.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Magnesium**.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Magnesium** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Metal, metal compounds and alloys are often used in "hot" operations in the workplace. These may include, but are not limited to, welding, brazing, soldering, plating, cutting, and metallizing. At the high temperatures reached in these operations, metals often form metal fumes which have different health effects and exposure standards than the original metal or metal compound and require specialized controls. Your workplace can be evaluated for the presence of particular fumes which may be generated. Consult the appropriate New Jersey Department of Health and Senior Services Hazardous Substance Fact Sheets.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Magnesium**:

- * **Magnesium dust** can irritate the eyes and skin.
- * Breathing **Magnesium dust** can irritate the nose, throat and lungs causing coughing, wheezing and/or shortness of breath.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Magnesium** and can last for months or years:

Cancer Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Magnesium** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Magnesium** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * Repeated exposure to the *dust* can cause **Magnesium** to accumulate in the body. This will cause an upset stomach.

MEDICAL

Medical Testing

There is no special test for this chemical. However, if illness occurs or overexposure is suspected, medical attention is recommended.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically transfer **Magnesium** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Magnesium** should change into clean clothing promptly.
- * Do not take contaminated work clothes home. Family members could be exposed.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Magnesium**.
- * Eye wash fountains should be provided in the immediate work area for emergency use.
- * If there is the possibility of skin exposure, emergency shower facilities should be provided.
- * On skin contact with **Magnesium**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Magnesium**, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Magnesium** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- * Use a vacuum to reduce dust during clean-up. **DO NOT DRY SWEEP.**

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Magnesium**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear impact resistant eye protection with side shields or goggles.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * NIOSH has established new testing and certification requirements for negative pressure, air purifying, particulate filter and filtering facepiece respirators. The filter classifications of dust/mist/fume, paint spray or pesticide prefilters, and filters for radon daughters, have been replaced with the N, R, and P series. Each series has three levels of filtering efficiency: 95%, 99%, and 99.9%. Check with your safety equipment supplier or your respirator manufacturer to determine which respirator is appropriate for your facility.
- * If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Magnesium**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.

- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Magnesium** you should be trained on its proper handling and storage.
- * *Finely powdered Magnesium* must be stored to avoid contact with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG ACIDS (such as HYDROCHLORIC, SULFURIC, and NITRIC); HALOCARBONS; CARBONATES; SULFATES; CYANIDES; CHLORINATED HYDROCARBONS (such as CARBON TETRACHLORIDE and CHLOROFORM); METHANOL; ACETYLENE; ETHYLENE OXIDE; BERYLLIUM FLUORIDE; AMMONIUM SALTS; ARSENIC; PHOSPHATES; and METAL OXIDES (such as MERCURIC OXIDE and CUPRIC OXIDE) since violent reactions occur.
- * Store in tightly closed containers in a cool, well-ventilated area away from WATER and MOISTURE as **Magnesium** in finely *powdered, chip or sheet* form will react with WATER to form flammable *Hydrogen gas*.
- * Use only non-sparking tools and equipment, especially when opening and closing containers of **Magnesium**.
- * Sources of ignition, such as smoking and open flames, are prohibited where **Magnesium** is used, handled, or stored.
- * Protect storage containers from physical damage.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include dust releasing operations (grinding, mixing, blasting, dumping, etc.), other physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: <http://www.state.nj.us/health/eoh/odisweb/>

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.



NIOSH Pocket Guide to Chemical Hazards

[NPG Home](#) | [Introduction](#) | [Synonyms & Trade Names](#) | [Chemical Names](#) | [CAS Numbers](#) | [RTECS Numbers](#) | [Appendices](#) | [Search](#)

Manganese compounds and fume (as Mn)		CAS 7439-96-5 (metal)	
Mn (metal)		RTECS OO9275000 (metal)	
Synonyms & Trade Names Manganese metal: Colloidal manganese, Manganese-55 Synonyms of other compounds vary depending upon the specific manganese compound.		DOT ID & Guide	
Exposure Limits	NIOSH REL*: TWA 1 mg/m ³ ST 3 mg/m ³ [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]		
	OSHA PEL*: C 5 mg/m ³ [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl and Methyl cyclopentadienyl manganese tricarbonyl.]		
IDLH 500 mg/m ³ (as Mn) See: 7439965	Conversion		
Physical Description A lustrous, brittle, silvery solid.			
MW: 54.9	BP: 3564°F	MLT: 2271°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.20 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Combustible Solid			
Incompatibilities & Reactivities Oxidizers [Note: Will react with water or steam to produce hydrogen.]			
Measurement Methods NIOSH 7300 , 7301 , 7303 , 9102 ; OSHA ID121 , ID125G See: NMAM or OSHA Methods			
Personal Protection & Sanitation (See protection codes) Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH			
Up to 10 mg/m³: (APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100. Click here for information on selection of N, R, or P filters. (APF = 10) Any supplied-air respirator			
Up to 25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 25) Any powered air-purifying respirator with a high-efficiency particulate filter.			
Up to 50 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters. (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode			

(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³:

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. [Click here](#) for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus

[Important additional information about respirator selection](#)

Exposure Routes inhalation, ingestion

Symptoms Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage

Target Organs respiratory system, central nervous system, blood, kidneys

See also: [INTRODUCTION](#) See ICSC CARD: [0174](#) See MEDICAL TESTS: [0131](#)

[NIOSH Home](#) | [NIOSH Search](#) | [Site Index](#) | [Topic List](#) | [Contact Us](#)

CONOCO,INC. -- CONOCO TRACON MOTOR OIL 10W-40 -- 9150-00B030018

===== Product Identification =====

Product ID:CONOCO TRACON MOTOR OIL 10W-40

MSDS Date:10/21/1985

FSC:9150

NIIN:00B030018

MSDS Number: BBBHW

=== Responsible Party ===

Company Name:CONOCO,INC.

Box:1267

City:PONCA CITY

State:OK

ZIP:74603

Country:US

Info Phone Num:405 767-6000

Emergency Phone Num:800 424-9300

CAGE:DO836

=== Contractor Identification ===

Company Name:CONOCO,INC.

Box:1267

City:PONCA CITY

State:OK

ZIP:74603

Country:US

Phone:405 767-6000

CAGE:DO836

===== Composition/Information on Ingredients =====

Ingred Name:NO HAZARDOUS MATERIALS

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO

Effects of Overexposure:THIS PRODUCT MAY CAUSE IRRITATION TO
EYES,LUNGS,OR SKIN AFTER PROLONGED EXPOSURE.

===== First Aid Measures =====

First Aid:EYES:QUICKLY WASH WITH FRESH WATER FOR 15 MIN AND GET MEDICAL
ATTENTION.SKIN:WASH WITH SOAP AND WATER AND REMOVE CONTAMINATED
CLOTHING.INHALATION: IF OVEREXPOSED,REMOVE INDIVIDUAL TO FRESH AIR.
IF BREATHING STOPS,ADMINISTER ARTIFICIAL RESPIRATION.INGESTION:IF
SWALLOWED,DONOT INDUCE VOMITING.IF VOMITING BEGINS,LOW VICTIMS HEAD
IN AN EFFECT TO PREVENT VOMITUS FROM ENTERING LUNGS.CALL PHYSICIAN.

===== Fire Fighting Measures =====

Flash Point Method:PMCC

Flash Point:340

Extinguishing Media:USE WATER SPRAY, DRY CHEMICAL, FOAM, OR CARBON DIOXIDE

Fire Fighting Procedures:WATER OR FOAM MAY CAUSE FROTHING. USE WATER TO
KEEP FIRE EXPOSED CONTAINERS COOL. WATER SPRAY MAY BE USED TO FLUSH
SPILLS AWAY FROM EXPOSURES.

Unusual Fire/Explosion Hazard:PRODUCTS OF COMBUSTION MAY CONTAIN CARBON
MONOXIDE,CARBON DIOXIDE,AND OTHER TOXIC MATERIALS. DONOT ENTER

ENCLOSED SPACE WITHOUT PROTECTIVE EQUIPMENT.

===== Accidental Release Measures =====

Spill Release Procedures:CONTAIN SPILL IMMEDIATELY IN SMALLEST AREA POSSIBLE.RECOVER AS MUCH OF THE PRODUCT ITSELF AS POSSIBLE BY VACUUMING,FOLLOWED BY SOAKING UP RESIDUAL FLUIDS BY USE OF ABSORBENT MATERIALS.

===== Handling and Storage =====

Handling and Storage Precautions:PRODUCT IS CLASS IIIB COMBUSTIBLE LIQUID STORE AND HANDLE ACCORDINGLY.
Other Precautions:PROLONGED OR REPEATED SKIN CONTACT WITH USED MOTOR OIL MAY BE HARMFUL. WASH THOROUGHLY WITH SOAP AND WATER AFTER CONTACT.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NONE REQUIRED EXCEPT UNDER UNUSUAL CIRCUMSTANCES.
Ventilation:NORMAL SHOP VENTILATION.
Protective Gloves:NONE REQUIRED
Eye Protection:NONE REQUIRED
Other Protective Equipment:NONE REQUIRED
Supplemental Safety and Health

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:650-1200 F
Spec Gravity:0.88
Solubility in Water:INSOLUBLE
Appearance and Odor:BROWN LIQUID;MILD PETROLEUM HYDROCARBON ODOR

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
Stability Condition to Avoid:STRONG OXIDIZING MATERIALS,HEAT,FLAME
Hazardous Decomposition Products:NORMAL COMBUSTION FORMS,CARBON DIOXIDE.INCOMPLETE COMBUSTION MAY PRODUCE CARBON MONOXIDE.

===== Disposal Considerations =====

Waste Disposal Methods:RECYCLE AS MUCH OF THE RECOVERABLE PRODUCT AS POSSIBLE.DISPOSE OF NONRECYCLABLE MATERIAL BY SUCH METHODS AS CONTROLLED INCINERATION,COMPLYING WITH FEDERAL,STATE AND LOCAL REGULATIONS.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

MTBE – EFOA Safety Data Sheet Guidance

This document has been prepared by EFOA in order to provide guidance on the content of EU Safety Data Sheets (SDS) on MTBE.

Disclaimer: This document is for information only and provides guidance on the preparation of Safety Data Sheets in accordance with various European Directives. While every effort is made to ensure the accuracy of the information, no representations or warranties are made with regard to its completeness and the authors cannot accept responsibility for any consequences of following the guidance contained herein. It is essential to note that this document has no official status; for information on the specific preparation of Safety Data Sheets in individual cases, independent advice should be sought.

It should be emphasised that the current Safety Data Sheets Directive (2001/58/EEC) requires that only competent persons should prepare safety data sheets.

- **Identification of the substance/preparation and of the company/undertaking**

- Product name – will be company specific to be entered as appropriate
- Chemical name - methyl tertiary butyl ether
- CAS number – 1634-04-4
- Uses – gasoline blending component.

Note: there may be other uses that also need to be indicated here.

- **Composition/information on ingredients**

- Where known, all components of the product can be listed together with appropriate classification and labelling, classified components have to be listed according to the Directive 91/155/EC, for example:

<u>Component</u>	<u>CAS No</u>	<u>EU Inventory</u>	<u>Classification/</u>
<u>Concentration</u>		<u>No</u>	<u>Labelling</u>
t-butyl methyl ether	1634-04-4	216-653-1	R11, R38 ≥ 98%
methanol	67-56-1	200-659-6	R11, R23/24/25, < 0.5%

- **Hazards Identification**

- Classification: Highly Flammable (F), Irritant (Xi)
- R Phrases: R11 – Highly Flammable, R38 – Irritating to skin (It is not necessary to mention the symbols and R-phrases, the text is sufficient)
Other advice regarding potential hazards and exposures may be included here – this advice may be specific and related to particular applications/usage of the product.
- MTBE is not readily biodegradable.
This phrase is optional in this section as it already appears in the ecotoxicology section. Non ready biodegradability is not a hazard in itself

and it does not result in an EU classification & labelling requirement. However, it may be appropriate to include this phrase in this section depending on specific circumstances and review by individual companies.

- **First Aid Measures**

- First Aid advice will be company specific

- **Fire Fighting Measures**

- Fire Fighting Measures will be company specific. Advice on use of suitable extinguishing media may include: dry chemicals, CO₂, water spray/fog or alcohol-resistant foam. Water jets should NOT be used.
- A warning may also be given indicating that MTBE can form explosive mixtures with air.

- **Accidental Release Measures**

May include the following advice:

- Personal precautions
 - avoid contact with skin and eyes, wear personal protective equipment
 - evacuate people upwind from the spill area
 - keep away from sources of ignition – no smoking
 - vapour heavier than air – prevent vapour accumulating in ground hollows and confined spaces
 - ensure adequate ventilation
- Environmental precautions
 - do not allow to enter water courses/ sewers or soil
 - avoid penetration into drainage systems/underground voids due to danger of explosion

- **Handling and Storage**

- Protection against fire and explosion may include:
 - Avoiding sources of ignition such as static discharges:
 - Specifying the use of non-sparking tools
 - Atmospheric monitoring, purging, etc.
- Advice on storage may include:
 - Precautionary measures should be taken to prevent product spills into drains or groundwater
 - Incompatible materials include most plastics, Viton and Fluorel

- **Exposure controls and Personal Protection**

- There is a need to indicate components with workplace control parameters, for example:

Component	Source	Value/Units	Type	Notation
MTBE	OEL (IT)	40ppm	8hr/TWA	No
Methanol	OEL (IT)	200ppm	8hr/TWA	Skin

The exposure limits should be detailed as appropriate for individual components and country-specific .

- Personal Protective Equipment
Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.
 - Respiratory Protection:
In the case of dusts/vapours/aerosols being formed, especially in excess of the occupational exposure limits, respiratory equipment with a suitable filter (may be specified for the particular exposure situation) or self-contained breathing apparatus may be necessary.
 - Dermal protection:
Chemical-resistant protective gloves (may be specified for the particular exposure situation) should be worn, such as nitrile or polyvinyl alcohol. Also, depending on conditions, apron, boots, head and face protection should be worn.
 - Eye protection:
Closed Goggles
Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- **Physical and Chemical Properties**
 - Properties will be product/company specific. The following properties are typical:

Form: Liquid
Colour: Colourless
Odour: Strong characteristic – terpene like
pH: Not applicable
Melting point: -108°C
Boiling point: ~ 55°C (1.013hPa)
Flash point: -28.2°C Method: Closed cup
Ignition temperature: 460°C Method: DIN 51 794
Lower explosion limit: 1,5%(V)
Upper explosion limit: 8,5%(V)
Vapour Pressure: 270 hPa (20°C)
Density: Ca. 0,741 g/cm³ (20°C)
Water solubility: Ca. 42 g/l (20°C)
Partition coefficient (n-octanol/water) Log Pow: 1,06 (measured)
Viscosity, dynamic: 0,36 mPa.s (20°C)
Decomposition temperature: Above 200°C
Henry's law constant: 43.8 Pa m³/mol at 20°C
- **Stability and Reactivity**
 - Advice will be company/product specific advice compatible with physico-chemical properties but may include the following:

Keep away from heat and sources of ignition
Materials to avoid, strong oxidizing agent, strong acids, strong bases,
halogens

- **Toxicological Information**

Information may be product/company specific. The following information is typical:

- Acute oral toxicity: LD50 rat: 3.870 mg/kg
- Acute inhalation toxicity: LC50 rat: 85-120 mg/l /4h
Inhalation of high vapour concentrations can cause CNS-depression and narcosis
- Acute dermal toxicity: LD50 rabbit: >10.000 mg/kg
- Skin irritation: Moderately irritating
- Sensitisation: Not sensitising
- Eye irritation: Slightly irritating
- Repeated dose toxicity: Repeated exposures of rodents to high levels of MTBE results in effects in both liver and kidney. The 'no observed adverse effect level' derived from these studies is higher than foreseeable human exposures.
- Mutagenicity assessment: Not classified as mutagenic
- Carcinogenicity: Not classified as carcinogenic
- Reproduction toxicity: Not classified as a reproductive toxicant
- Human experience: Vapour irritates the eyes and the respiratory tract. Over-exposure may lead to dizziness, nausea, headache and finally narcotic effects. Prolonged or repeated contact causes drying and irritation of the skin. When ingested, product may irritate the digestive tract.

- **Ecological Information**

Information may be product/company specific. The following information is typical:

- Environmental fate:
 - Not readily biodegradable
 - Photodegradation half-life (Direct photolysis): 3-6 days
 - This material is volatile and water soluble.
 - This material may enter soil and may contaminate ground water.
 - This material is likely to evaporate from soil and water.
 - This material is not expected to bio-accumulate.
- Ecotoxicity
 - Toxicity to fish: LC50 *Leuciscus idus melanotus*: >500,00 mg/l/96h Very low toxicity
 - Toxicity to daphnia: EC50 *Daphnia magna*: >340/48h Very low toxicity
 - Toxicity to algae: EC50 *scenedesmus subspicatus*: >800,00 mg/l/72h Very low toxicity

- Toxicity to bacteria: EC10 Pseudomonas putida:
ca. 710 mg/l/18h Very low toxicity

- **Disposal Considerations**

- Disposal of waste containing MTBE needs to be in accordance with the relevant regulations, for example advise may include:
 - Dispose of to suitable waste incineration plant.
 - When handling waste containing MTBE, the hazards need to be assessed and the necessary precautions applied to prevent exposure and environmental emissions.

- **Transport Information**

- Information may be product specific. The following information is current for MTBE:

Land transport ADR/RID

Class	3
ADR/RID-Labels	3
UN-No.	2398
Packaging group	II
orange warning plate	33 / 2398
Description of the goods (Technical name)	
METHYL tert-BUTYL ETHER	

Sea transport IMDG-Code

Class	3
UN-No.	2398

Packaging group	II
EmS	3-07
Proper technical name (Proper shipping name)	
METHYL tert-BUTYL ETHER	

Air transport ICAO-TI/IATA-DGR

Class	3
UN-No.	2398

Packaging group	II
Proper technical name (Proper shipping name)	
METHYL tert-BUTYL ETHER	

Loading instructions/Remarks

IATA-C	ERG-Code 3L
IATA-P	ERG-Code 3L

- **Regulatory Information**

- Labelling according to EU Regulations:

Statutory basis/list Symbol(s):	According to Directive 67/548/EEC F Highly flammable Xi Irritant
R-phrases(s):	R11 Highly flammable R38 Irritating to skin
S-phrases(s):	S9 Keep container in a well ventilated space S16 Keep away from sources of ignition – No smoking S24 Avoid contact with skin

Sources of information that may be useful in compiling a MTBE Safety Data Sheet include the EU Risk Assessment Report on MTBE and MTBE Safety Data Sheet example, both of which are available via EFOA (website address www.foia.org).

EFOA – March 2003

MSDS Number: **N0090** * * * * * Effective Date: **08/10/04** * * * * * Supercedes: **11/02/01**

MSDS	Material Safety Data Sheet	
	From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	
24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300		National Response in Canada CANUTEC: 613-996-6666
Outside U.S. and Canada Chemtrec: 703-527-3887		NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2637) for assistance.		

NAPHTHALENE

1. Product Identification

Synonyms: Naphthene; mothballs; tar camphor; naphthaliin; white-tar
CAS No.: 91-20-3
Molecular Weight: 128.16
Chemical Formula: C10H8
Product Codes:
 J.T. Baker: 2718
 Mallinckrodt: 6348

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Naphthalene	91-20-3	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
 Flammability Rating: 2 - Moderate
 Reactivity Rating: 0 - None
 Contact Rating: 2 - Moderate
 Lab Protective Equip: GOGGLES; LAB COAT
 Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.

Ingestion:

Toxic. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Intravascular hemolysis may also occur with symptoms similar to those noted for inhalation. Severe cases may produce coma with or without convulsions. Death may result from renal failure.

Skin Contact:

Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.

Eye Contact:

Vapors and solid causes irritation, redness and pain. Very high exposures can damage the nerves of the eye.

Chronic Exposure:

Has led to cataract formation in eyes. May cause skin allergy.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin, blood or vascular disorders or impaired respiratory function may be more susceptible to the effects of the substance. Particularly susceptible individuals are found in the general population, most commonly in dark skinned races.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: 87C (189F) CC

Autoignition temperature: 526C (979F)

Combustible. May be ignited by heat, sparks or flame. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases.

Explosion:

Explosive limits, volume % in air: lel: 0.9; uel: 5.9. Above flashpoint, vapor-air mixtures are explosive within flammable limits noted above. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire or explosion.

Fire Extinguishing Media:

Dry chemical, foam, water or carbon dioxide. Foam or direct water spray on molten naphthalene may cause extensive foaming. Molten naphthalene spatters in contact with water; apply water from as far a distance as possible.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Keep away from moisture and oxidizers. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):
10 ppm, 50 mg/m³.

- ACGIH Threshold Limit Value (TLV):

TWA= 10 ppm, 52 mg/m³

STEL= 15 ppm, 79 mg/m³.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

White crystals.

Odor:

Strong coal tar odor (moth balls).

Solubility:

Insoluble in water.

Specific Gravity:

1.2

pH:

No information found.

% Volatiles by volume @ 21C (70F):

No information found.

Boiling Point:

218C (424F)

Melting Point:

80C (176F)

Vapor Density (Air=1):

4.4

Vapor Pressure (mm Hg):

1 @ 53C (127F)

Evaporation Rate (BuAc=1):

< 1

10. Stability and Reactivity

Stability:

Stable at room temperature in sealed containers. Sublimes appreciably at temperatures above melting point.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizers, strong alkalis and strong mineral acids, mixtures of aluminum trichloride and benzoyl chloride. Reacts violently with chromic anhydride.

Melted naphthalene will attack some forms of plastics, rubber, and coatings.

Conditions to Avoid:

Avoid heat, sparks, flames and other ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 490 mg/kg;

Inhalation rat LC50: 340 mg/m3, 1 hour;

Skin rabbit LD50: > 20 g/kg;

Irritation data: skin (open Draize) rabbit 495 mg, mild; eye (standard Draize) rabbit 100 mg, mild;

Investigated as a tumorigen, mutagen and reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Naphthalene (91-20-3)	No	No	None

12. Ecological Information

Environmental Fate:

When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater.

When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released

into water, this material may biodegrade to a moderate extent. When released into the water, this material is expected to have a half-life between 1 and 10 days.

This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically

produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.

Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NAPHTHALENE, REFINED

Hazard Class: 4.1

UN/NA: UN1334
 Packing Group: III
Information reported for product/size: 1KG

International (Water, I.M.O.)

Proper Shipping Name: NAPHTHALENE, REFINED
Hazard Class: 4.1
 UN/NA: UN1334
 Packing Group: III
Information reported for product/size: 1KG

International (Air, I.C.A.O.)

Proper Shipping Name: NAPHTHALENE, REFINED
Hazard Class: 4.1
 UN/NA: UN1334
 Packing Group: III
Information reported for product/size: 1KG

15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  EC   Japan  Australia
-----
Naphthalene (91-20-3)                         Yes  Yes  Yes    Yes

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     Korea  DSL   NDSL   Phil.
-----
Naphthalene (91-20-3)                         Yes   Yes  No     Yes

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
RQ  TPQ  List  Chemical Catg.
-----
Naphthalene (91-20-3)                         No   No   Yes    No

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-  -TSCA-
CERCLA  261.33  8 (d)
-----
Naphthalene (91-20-3)                         100    U165  No
  
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: 2Z

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 2 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

Label Precautions:

Avoid contact with eyes, skin and clothing.
 Avoid prolonged or repeated contact with skin.
 Avoid breathing dust.
 Avoid breathing vapor.
 Keep container closed.
 Use only with adequate ventilation.
 Wash thoroughly after handling.
 Keep away from heat, sparks and flame.

Label First Aid:

In all cases call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.

This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

BELMONT METALS INC -- NICKEL -- 9650-00N093372

===== Product Identification =====

Product ID:NICKEL
 MSDS Date:02/01/1995
 FSC:9650
 NIIN:00N093372
 Status Code:A
 MSDS Number: CJXVZ
 === Responsible Party ===
 Company Name:BELMONT METALS INC
 Address:330 BELMONT AVE
 City:BROOKLYN
 State:NY
 ZIP:11207
 Info Phone Num:718-342-4900
 Emergency Phone Num:718-342-4900
 Resp. Party Other MSDS Num.:9002
 CAGE:70774
 === Contractor Identification ===
 Company Name:BELMONT METALS INC
 Address:330 BELMONT AVE
 Box:City:BROOKLYN
 State:NY
 ZIP:11207
 Phone:718-342-4900
 Contract Num:N00406-99-P-F82
 CAGE:70774

===== Composition/Information on Ingredients =====

Ingrid Name:NICKEL
 CAS:7440-02-0
 RTECS #:QR5950000
 > Wt:99.9
 OSHA PEL:1 MG/M3
 ACGIH TLV:1 MG/M3

===== Hazards Identification =====

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
 Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
 Health Hazards Acute and Chronic:INHALATION: SEE BELOW. INGESTION: MAY
 CAUSE IRRITATION OF STOMACH LINING. EYE: MAY CAUSE IRRITATION OF THE
 EYES. SKIN CONTACT/ABSORPTION: MAY CAUSE SKIN IRRITATION. SIGNS AND
 SYMPTOMS ASSOCIATED WITH EXPOSURE OVER TLV: NO ACUTE RESPIRATORY
 REACTION OR CONCLUSIVE CHRONIC EFFECTS FROM EXPOSURE TO NICKEL
 METAL HAVE BEEN OBSERVED BY PROPER INDUSTRIAL HYGIENE MAINTENANCE
 WORKING ATMOSPHERE AT CONCENTRATIONS BELOW THE RECOMMENDED TLV.
 OVER HEATING OF ALLOY CAN PRODUCE METAL FUMES AND OXIDES. MACHINING
 OPERATIONS SUCH AS GRINDING, SAWING, BUFFING CAN GENERATE AIRBORNE
 PARTICULATE IN THE WORK AREA. THE EXPOSURE LEVELS (EFFECTS OF
 OVEREXPOSURE)
 Explanation of Carcinogenicity:NICKEL: IARC MONOGRAPHS ON THE
 EVALUATION OF CARCINOGENIC RISK OF CHEMICALS TO MAN. VOLUME 49,
 PAGE 257, YEAR 1990: GROUP 2B. NTP 8TH ANNUAL REPORT ON
 CARCINOGENS, 1998: REASONABLY ANTICIPATED TO BE HUMAN CARCINOGEN.
 Effects of Overexposure:HLTH HAZ: INDICATED IN SECTION II ARE RELEVANT

TO THESE & OTHER OPERATIONS. CEILING LIMITS(C): ELEMENTS W/CEILING LIMITS(C) ARE AS FOLLOWS: NONE: FOLLOWING ARE SYMPTOMS OF OVER EXPOSURE TO VARIOUS INGREDIENTS: NICKEL: MOST COMMON AILMENT ARISING FROM CONTACT W/NICKEL/ITS COMPOUNDS IS ALLERGIC DERMATITIS KNOWN AS "NICKEL ITCH" WHICH USUALLY OCCURS WHEN SKIN IS MOIST. GENERALLY NICKEL & MOST SALTS OF NICKEL DO NOT CAUSE SYSTEMIC POISONING. IARC HAS DETERMINED THAT THERE IS AT LEAST LIMITED EVIDENCE THAT NICKEL AND CERTAIN NICKEL COMPOUNDS MAY BE HUMAN CARCINOGENS. (SUPDAT)

Medical Cond Aggravated by Exposure:NOT APPLICABLE.

===== First Aid Measures =====

First Aid:INHALATION: REMOVE TO FRESH AIR. CONSULT A PHYSICIAN.
 INGESTION: INDUCE VOMITING IF PATIENT IS CONSCIOUS. CONSULT A PHYSICIAN. EYE CONTACT: FLUSH WITH COPIOUS QUANTITIES OF WATER FOR AT LEAST 15 MINUTES. SKIN CONTACT: WASH WELL WITH SOAP AND WATER. SKIN ABSORPTION: NOT APPLICABLE.

===== Fire Fighting Measures =====

Lower Limits:N.A.
 Upper Limits:N.A.
 Extinguishing Media:CO*2, SAND, DRY CHEMICAL. DO NOT USE WATER.
 Fire Fighting Procedures:USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT .
 Unusual Fire/Explosion Hazard:DO NOT USE WATER MOLTEN METAL WILL EXPLODE ON CONTACT WITH WATER.

===== Accidental Release Measures =====

Spill Release Procedures:ANY NORMAL CLEAN UP PROCEDURE IS APPLICABLE.

===== Handling and Storage =====

Handling and Storage Precautions:THIS PRODUCT MUST BE HANDLED ACCORDING TO THE SIZE, SHAPE AND QUANTITY OF MATERIAL INVOLVED. SOLID METAL MAY REQUIRE USE OF HOISTS CRANES ETC. POWDERS SHOULD BE MOVED OR TRANSPORTED TO MINIMIZE SPILL OR RELEASE POTENTIAL. IN SOLID FORM THIS MATERIAL POSES NO SPECIAL STORAGE PROBLEMS.
 Other Precautions:DO NOT STORE ADJACENT TO MINERAL ACIDS. FINE METAL POWDER SHOULD BE KEPT AWAY FROM FLAMES AND SOURCES OF IGNITION.

===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH APPROVED RESPIRATOR FOR DUSTS AND FUMES.
 Ventilation:PROVIDE GENERAL AND/OR LOCAL VENTILATION IF NECESSARY TO MAINTAIN CONCENTRATIONS BELOW TLV'S.
 Protective Gloves:IMPERVIOUS GLOVES .
 Eye Protection:ANSI APPROVED CHEMICAL WORKERS GOGGLES .
 Other Protective Equipment:ANSI APPROVED EYE WASH AND DELUGE SHOWER .
 PROTECTIVE CLOTHING ADVISABLE DURING MELTING AND PURING.
 Supplemental Safety and Health
 EFFECTS OF OVEREXPOSURE: SEVERAL NICKEL COMPOUNDS ARE CARCINOGENIC TO LABORATORY ANIMALS BY VARIOUS ROUTES OF ENTRY.

===== Physical/Chemical Properties =====

Boiling Pt:=2732.2C, 4950.F
 Decomp Temp:=1451.7C, 2645.F

Vapor Pres:N.A.
Vapor Density:N.A.
Spec Gravity:8.90
Evaporation Rate & Reference:N.A.
Solubility in Water:NEGLIGIBLE
Appearance and Odor:SILVERY GRAY METAL; NO ODOR.
Percent Volatiles by Volume:N.A.

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
REACTS WITH MINERAL ACIDS TO LIBERATE HYDROGEN.
Stability Condition to Avoid:STORAGE NEAR MINERAL ACIDS.
Hazardous Decomposition Products:EVOLVED HYDROGEN MAY BECOME AN
EXPLOSION HAZARD.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF IN ACCORDANCE WITH STATE, FEDERAL AND
LOCAL REGULATIONS.

===== MSDS Transport Information =====

Transport Information:DOT REGULATED: NO. DOT PROPER SHIPPING NAME: NOT
APPLICABLE. DOT HAZARD CLASS: NOT APLICABLE. DOT NUMBER: NOT
APPLICABLE.

===== Regulatory Information =====

SARA Title III Information:NICKEL IS SUBJECT TO THE REPORTING
REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENT
AND REAUTHORIZATION ACT OF 1986 IN 40 CFR PART 372.
Federal Regulatory Information:RCRA REGULATED: NO. RCRA NUMBER: NOT
APPLICABLE. CERCLA (SUPERFUND) REPORTABLE QUANTITY: NOT APPLICABLE.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department
of Defense. The United States of America in no manner whatsoever,
expressly or implied, warrants this information to be accurate and
disclaims all liability for its use. Any person utilizing this
document should seek competent professional advice to verify and
assume responsibility for the suitability of this information to their
particular situation.



[Division of Facilities Services](#)

**DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only**

PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Compositon/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

**Section 1 - Product and Company Identification
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD**

Product Identification: PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Date of MSDS: 12/09/1985 **Technical Review Date:** 10/26/1988

FSC: 5910 **NIIN:** LIIN: 00F007527

Submitter: F BT

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: WESCO ELECTRICAL CO
Post Office Box: N/K
Manufacturer's Address1: 201 MUNSON ST
Manufacturer's Address2: GREENVILLE, MA 01301-9605
Manufacturer's Country: NK
General Information Telephone: (413) 774-4358
Emergency Telephone: (413) 774-4358
Emergency Telephone: (413) 774-4358
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 12673
Special Project Code: N

Preparer Information

Preparer's Name: WESCO ELECTRICAL
Preparer's Address1: 201 MUNSON ST
Preparer's Address2: GREENVILLE, MA 01301
Preparer's CAGE: 12673
Assigned Individual: N

Contractor Information

Contractor's Name: WESCO ELECTRICAL
Contractor's Address1: 201 MUNSON ST
Contractor's Address2: GREENVILLE, MA 01301
Contractor's Telephone: (413) 774-4358
Contractor's CAGE: 12673

Section 2 - Compositon/Information on Ingredients
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Ingredient Name: LEAD (SARA III)
Ingredient CAS Number: 7439-92-1 **Ingredient CAS Code:** M
RTECS Number: OF7525000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: 99.9%
% Enviromental Weight:

Other REC Limits: N/K

OSHA PEL: 0.05 MG/M3;1910.1025 **OSHA PEL Code:** M

OSHA STEL: **OSHA STEL Code:**

ACGIH TLV: 0.15 MG/M3;DUST 9192 **ACGIH TLV Code:** M

ACGIH STEL: N/P **ACGIH STEL Code:**

EPA Reporting Quantity: 1 LB

DOT Reporting Quantity: 1 LB

Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Health Hazards Acute & Chronic: IRRITATING TO THE RESPIRATORY SYSTEM, SKIN, & EYES, WEAKNESS, VOMITING, LOSS OF APPETITE, UNCOORDINATION, CONVULSIONS, STUPOR, COMA.

Signs & Symptoms of Overexposure:

IF LEFT UNTREATED: WEAKNESS, INSOMNIA, HYPERTENSION, IRRITATION TO SKIN & EYE, ANEMIA, METALIC TASTE, CONSTIPATION, HEADACHE, MUSCLE & JOINT PAIN, NEUROMUSCULAR DYSFUNCTION, PARALYSIS, ENCEPHALOPATHY. LEAD & ITS INORGANIC COMPOUNDS ARE NEUROTOXINS WHICH MAY PRODUCE PERIPHERAL NEUROPATHY.

Medical Conditions Aggravated by Exposure:

N/K

LD50 LC50 Mixture: N/K

Route of Entry Indicators:

Inhalation: YES

Skin: YES

Ingestion: YES

Carcinogenicity Indicators

NTP: NO

IARC: NO

OSHA: NO

Carcinogenicity Explanation: NONE

Section 4 - First Aid Measures
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

First Aid:

EYES: FLUSH WITH COPIOUS QUANTITIES OF WATER. GET MEDICAL ATTENTION. SKIN: WASH THOROUGHLY WITH SOAP & WATER. INHALATION: REMOVE FROM EXPOSURE. GET MEDICAL ATTENTION. INGESTION: GET MEDICAL ATTENTION.

Section 5 - Fire Fighting Measures
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Fire Fighting Procedures:

WEAR SELF-CONTAINED BREATHING APPARATUS (SCBA) AND FULL PROTECTIVE CLOTHING.

Unusual Fire or Explosion Hazard:

MOLTEN METALS PRODUCE FUME, VAPOR & DUST THAT MAY BE TOXIC & RESPIRATORY IRRITANTS.

Extinguishing Media:

DRY CHEMICAL, CO2. DON'T USE WATER ON FIRES WHERE MOLTEN METAL IS PRESENT.

Flash Point: Flash Point Text: N/R

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): N/R

Upper Limit(s): N/R

Section 6 - Accidental Release Measures
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Spill Release Procedures:

DUST MATERIAL SHOULD BE VACUUMED, OR WET SWEEPED WHERE VACUUMING ISN'T FEASIBLE. PARTICULATE MATTER SHOULD BE STORED IN DRY CONTAINERS FOR LATER DISPOSAL. DON'T USE COMPRESSED AIR OR DRY SWEEPING AS A MEANS OF CLEANING.

Section 7 - Handling and Storage
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Handling and Storage Precautions:**Other Precautions:**

Section 8 - Exposure Controls & Personal Protection
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Respiratory Protection:

N/K

Ventilation:

PROVIDE LOCAL EXHAUST VENTILATION TO KEEP **Protective Gloves:** SHOULD BE WORN

Eye Protection: FACE SHIELD, GOGGLES

Other Protective Equipment: COVERALLS, FULL BODY CLOTHING. HAT, SAFETY BOOTS, & SHOES SHOULD BE PROTECTED FROM CONTAMINATION WITH THIS PRODUCT.

Work Hygienic Practices: ALWAYS EXERCISE NORMAL, GOOD PERSONAL HYGIENE PRIOR TO SMOKING OR EATING.

Supplemental Health & Safety Information: N/P

Section 9 - Physical & Chemical Properties
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

HCC:**NRC/State License Number:****Net Property Weight for Ammo:****Boiling Point: Boiling Point Text:** 3164F**Melting/Freezing Point: Melting/Freezing Text:** 621F**Decomposition Point: Decomposition Text:** N/R**Vapor Pressure: N/R Vapor Density: N/R****Percent Volatile Organic Content:****Specific Gravity:** 11.3**Volatile Organic Content Pounds per Gallon:****pH:** N/R**Volatile Organic Content Grams per Liter:****Viscosity:** N/P**Evaporation Weight and Reference:** N/R**Solubility in Water:** NEGLIGIBLE**Appearance and Odor:** SILVER-GRAY METAL, TARNISHES; NO APPARENT ODOR.**Percent Volatiles by Volume:** N/R**Corrosion Rate:** N/R

Section 10 - Stability & Reactivity Data
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Stability Indicator: YES**Materials to Avoid:**

CAN REACT VIGOROUSLY WITH STRONG OXIDIZING AGENTS & THIS PRODUCT MAY LIBERATE HYDROGEN GAS.

Stability Condition to Avoid:

N/R

Hazardous Decomposition Products:

HIGH TEMPERATURES MAY PRODUCE HEAVY METAL FUME, VAPOR & DUST.

Hazardous Polymerization Indicator: NO**Conditions to Avoid Polymerization:**

N/R

Section 11 - Toxicological Information
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Toxicological Information:

N/P

Section 12 - Ecological Information
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Ecological Information:

N/P

Section 13 - Disposal Considerations
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Waste Disposal Methods:

DISPOSE OF TOXIC SUBSTANCES & HAZARDOUS WASTES IN ACCORDANCE WITH LOCAL, STATE & FEDERAL REGULATIONS.

Section 14 - MSDS Transport Information
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Transport Information:

N/P

Section 15 - Regulatory Information
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:

N/P

Section 16 - Other Information
PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

Other Information:

N/P

HAZCOM Label Information

Product Identification: PURE LEAD PIG LEAD, PURE LEAD BLOCK LEAD

CAGE: 12673

Assigned Individual: N

Company Name: WESCO ELECTRICAL

Company PO Box:

Company Street Address1: 201 MUNSON ST

Company Street Address2: GREENVILLE, MA 01301 NK

Health Emergency Telephone: (413) 774-4358

Label Required Indicator: Y

Date Label Reviewed: 12/16/1998

Status Code: C

Manufacturer's Label Number:

Date of Label: 12/16/1998

Year Procured: N/K

Organization Code: G

Chronic Hazard Indicator: N/P

Eye Protection Indicator: N/P

Skin Protection Indicator: N/P

Respiratory Protection Indicator: N/P

Signal Word: N/P

Health Hazard:

Contact Hazard:

Fire Hazard:

Reactivity Hazard:

8/8/2002 8:01:05 AM

MSDS Number: **T0767** * * * * * Effective Date: **05/19/08** * * * * * Supercedes: **08/16/05**

MSDS	Material Safety Data Sheet	24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300
		National Response in Canada CANUTEC: 613-996-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		Outside U.S. and Canada Chemtrec: 703-527-3887
		NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2637) for assistance.		

TETRACHLOROETHYLENE

1. Product Identification

Synonyms: ethylene tetrachloride; tetrachloroethene; perchloroethylene; carbon bichloride; carbon dichloride
CAS No.: 127-18-4
Molecular Weight: 165.83
Chemical Formula: Cl₂C:CCl₂
Product Codes:
 J.T. Baker: 9218, 9360, 9453, 9465, 9469
 Mallinckrodt: 1933, 8058

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Tetrachloroethylene	127-18-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)
 Flammability Rating: 0 - None
 Reactivity Rating: 1 - Slight
 Contact Rating: 2 - Moderate (Life)
 Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
 Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Irritating to the upper respiratory tract. Giddiness, headache, intoxication, nausea and vomiting may follow the inhalation of large amounts while massive amounts can cause breathing arrest, liver and kidney damage, and death. Concentrations of 600 ppm and more can affect the central nervous system after a few minutes.

Ingestion:

Not highly toxic by this route because of low water solubility. Used as an oral dosage for hookworm (1 to 4 ml). Causes abdominal pain, nausea, diarrhea, headache, and dizziness.

Skin Contact:

Causes irritation to skin. Symptoms include redness, itching, and pain. May be absorbed through the skin with possible systemic effects.

Eye Contact:

Causes irritation, redness, and pain.

Chronic Exposure:

May cause liver, kidney or central nervous system damage after repeated or prolonged exposures. Suspected cancer risk from animal studies.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance. The use of alcoholic beverages enhances the toxic effects.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard but becomes hazardous in a fire situation because of vapor generation and possible degradation to phosgene (highly toxic) and hydrogen chloride (corrosive). Vapors are heavier than air and collect in low-lying areas.

Explosion:

Not considered to be an explosion hazard. Containers may explode when involved in a fire.

Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Store in a cool, dry, ventilated area away from sources of heat or ignition. Isolate from flammable materials. Protect from direct sunlight. Wear special protective equipment (Sec. 8) for maintenance break-in or where exposures may exceed established exposure levels. Wash hands, face, forearms and neck when exiting restricted areas. Shower, dispose of outer clothing, change to clean garments at the end of the day. Avoid cross-contamination of street clothes. Wash hands before eating and do not eat, drink, or smoke in workplace. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (ceiling),

300 ppm/5min/3-hour (max)

-ACGIH Threshold Limit Value (TLV):

25 ppm (TWA), 100 ppm (STEL); listed as A3, animal carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, wear a supplied air, full-facepiece respirator, airtight hood, or full-facepiece self-contained breathing apparatus.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Ethereal odor.

Solubility:

0.015 g in 100 g of water.

Specific Gravity:

1.62 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

121C (250F)

Melting Point:

-19C (-2F)

Vapor Density (Air=1):

5.7

Vapor Pressure (mm Hg):

18 @ 25C (77F)

Evaporation Rate (BuAc=1):

0.33 (trichloroethylene = 1)

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Slowly decomposed by light. Deteriorates rapidly in warm, moist climates.

Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition. Hydrogen chloride gas and phosgene gas may be formed upon heating.

Decomposes with moisture to yield trichloroacetic acid and hydrochloric acid.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong acids, strong oxidizers, strong alkalis, especially NaOH, KOH; finely divided metals, especially zinc, barium, lithium. Slowly corrodes aluminum, iron and zinc.

Conditions to Avoid:

Moisture, light, heat and incompatibles.

11. Toxicological Information

Oral rat LD50: 2629 mg/kg; inhalation rat LC50: 4100 ppm/6H; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Tetrachloroethylene (127-18-4)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material is expected to quickly evaporate. When released into the soil, this material may leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released to water, this material is expected to quickly evaporate. When released into water, this material is not expected to biodegrade. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals.

Environmental Toxicity:

The LC50/96-hour values for fish are between 1 and 10 mg/l. The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

International (Air, I.C.A.O.)

Proper Shipping Name: TETRACHLOROETHYLENE

Hazard Class: 6.1

UN/NA: UN1897

Packing Group: III

Information reported for product/size: 4L

15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                               TSCA  EC   Japan  Australia
-----
Tetrachloroethylene (127-18-4)          Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                               Korea  --Canada--
                               DSL   NDSL   Phil.
-----
Tetrachloroethylene (127-18-4)          Yes   Yes   No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
Ingredient                               -SARA 302-  -SARA 313-
                               RQ   TPQ   List  Chemical Catg.
-----
Tetrachloroethylene (127-18-4)          No    No    Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
Ingredient                               CERCLA      -RCRA-      -TSCA-
                               261.33     8 (d)
-----
Tetrachloroethylene (127-18-4)          100         U210        No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 2[Z]

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 0 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor or mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING.

Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.

This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose.

MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING

WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

AMERADA HESS CORP -- PREMIUM UNLEADED GASOLINE -- 9130-00N038435

===== Product Identification =====

Product ID:PREMIUM UNLEADED GASOLINE
MSDS Date:01/13/1989
FSC:9130
NIIN:00N038435
MSDS Number: BQXMS
=== Responsible Party ===
Company Name:AMERADA HESS CORP
Address:1 HESS PLAZA
City:WOODBIDGE
State:NJ
ZIP:07095
Country:US
Info Phone Num:201-750-6000
Emergency Phone Num:800-424-9300(CHEMTREC)
CAGE:4N717

=== Contractor Identification ===

Company Name:AMERADA HESS CORP
Address:1 HESS PLAZA
Box:City:WOODBIDGE
State:NJ
ZIP:07095-1229
Country:US
Phone:908-750-6000, CHEMTREC 800-424-9300
CAGE:4N717

===== Composition/Information on Ingredients =====

Ingred Name:ING 17:OPEN SPILLS MAY EMIT FLAMM VAPS. APPROACH FROM
UPWIND IF POSS. AVOID BRTHG EMITTED VAPS. WEAR NIOSH/MSHA (ING 19)
RTECS #:9999999ZZ

Ingred Name:ING 18:APPRVD SELF CNTND POSITIVE PRESS BRTHG APPARATUS, IF
REQD, TO PVNT INHAL OF VAPS.
RTECS #:9999999ZZ

Ingred Name:WASTE DISP METH:OF VOLATILE, FLAMMABLE, VAPORS.
RTECS #:9999999ZZ

Ingred Name:OTHER PREC: IGNIT. USE ONLY AS A MOTOR FUEL. HNDLE,
TRANSPORT & STORE I/A/W APPLIC LAWS & REGS. ELEC EQUIP (ING 22)
RTECS #:9999999ZZ

Ingred Name:ING 21:SHOULD BE APPRVD FOR CLASSIFIED AREA. REMOVE SOILED
CLTHG & LAUNDER BEFORE-REUSE. DISCARD OIL SOAKED (ING 23)
RTECS #:9999999ZZ

Ingred Name:ING 22:SHOES. WEAR FULL LNGTH CLTHG, & LAUNDER ON A REGULAR
& FREQ BASIS. VENT MUST BE SUFFICIENT TO PVNT (ING 24)
RTECS #:9999999ZZ

Ingred Name:ING 23:ACCUMULATION OF TOX/FLAMM CONC OF VAPOR IN AIR.
RTECS #:9999999ZZ

Ingred Name:HYGIENE PRACT: UPWIND OF VAPOR OR MIST RELEASE, SPILL OR
LEAK.

RTECS #:9999999ZZ

Ingred Name:ETHER, TERT-BUTYL METHYL; (METHYL TERT-BUTYL ETHER &/OR
TERT-AMYL METHYL ETHER, CAS # 994-05-8)

CAS:1634-04-4

RTECS #:KN5250000

Fraction by Wt: <15%

EPA Rpt Qty:1 LB

DOT Rpt Qty:1 LB

Ingred Name:TOLUENE

CAS:108-88-3

RTECS #:XS5250000

Fraction by Wt: 15-<30%

OSHA PEL:200 PPM/150 STEL

ACGIH TLV:50 PPM; 9293

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:XYLENE (MIXED ISOMERS)

CAS:1330-20-7

RTECS #:ZE2100000

Fraction by Wt: 10-<15%

OSHA PEL:100 PPM;150 PPM STEL

ACGIH TLV:100 PPM;150 PPM STEL

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:BENZENE

CAS:71-43-2

RTECS #:CY1400000

Fraction by Wt: 0.1-<5%

OSHA PEL:10 PPM

ACGIH TLV:10 PPM

EPA Rpt Qty:10 LBS

DOT Rpt Qty:10 LBS

Ingred Name:BENZENE, ETHYL-; (ETHYL BENZENE)

CAS:100-41-4

RTECS #:DA0700000

Fraction by Wt: <3%

OSHA PEL:100 PPM;125 STEL

ACGIH TLV:100 PPM;125 STEL

EPA Rpt Qty:1000 LBS

DOT Rpt Qty:1000 LBS

Ingred Name:BENZENE, 1,2,4-TRIMETHYL-; (1,2,4-TRIMETHYLBENZENE)

CAS:95-63-6

RTECS #:DC3325000

Fraction by Wt: <6%

Ingred Name:SUPP DATA: IGNIT. VAPS CAN READILY FORM EXPLOS MIXT IN AIR.
HVR/AIR VAPS CAN FLOW ALONG SURF TO DIST SOURCES (ING 9)

RTECS #:9999999ZZ

Ingred Name:ING 8:IGNIT & FLASH BACK. FLOWING GASOLINE CAN BE IGNITED
BY SELF-GENERATED STATIC ELEC. RUNOFF TO SEWERS (ING 10)

RTECS #:9999999ZZ

Ingred Name:ING 9: MAY CREATE FIRE &/OR EXPLOSION HAZARD.

RTECS #:9999999ZZ

Ingred Name:EFTS OF OVEREXP:DISEASE, INCL LEUKEMIA, AFTER RPTD & PRLNGD
EXPOS @ HIGH CONC.INHAL TO 100 PPM MAY CAUSE SLIGHT (ING 12)

RTECS #:9999999ZZ

Ingred Name:ING 11:DROW & HDCH. 100-200 PPM MAY CAUSE FATG, NAUS, ITCH
& WILL FATG OLFATORY SENSES.IMMED DANGER TO HLTH/ (ING 13)

RTECS #:9999999ZZ

Ingred Name:ING 12:LIFE IS REPRESENTED BY 2,000 PPM. INGEST & INHAL OF
LIQ &/OR EXCESS VAPS CAN HAVE AN ANESTH EFT, CAUSE (ING 14)

RTECS #:9999999ZZ

Ingred Name:ING 13:VERTIGO, BLURRED VISION, VOMIT & CYANOSIS. OVEREXP
MAY CAUSE CNS DEPRESS. NOTE: TOLUENE CAS# 108-88-3 (ING 15)

RTECS #:9999999ZZ

Ingred Name:ING 14:APPEARS ON NAVY LIST OF OCCUP REPROD HAZ. SEEK
CONSULTATION FROM APPROP HLTH PROFESSIONALS CONCERNING (ING 16)

RTECS #:9999999ZZ

Ingred Name:ING 15:LATEST HAZ LIST INFO & SAFE HANDLING AND EXPOSURE
RECOMMENDATION .

RTECS #:9999999ZZ

Ingred Name:SPILL PROC: ANIMAL/AQUATIC LIFE. CAUTION-EVAC ALL
NON-ESSENTIAL PERS. SPILLED MATL MAY CAUSE SLIPPERY CNDTNS. (ING
18)

RTECS #:9999999ZZ

Ingred Name:GASOLINE CONTAINING INGS 2-7

CAS:8006-61-9

RTECS #:LX3300000

Fraction by Wt: 100%

OSHA PEL:300 PPM;500 STEL

ACGIH TLV:300 PPM;500 STEL

===== Hazards Identification =====

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.

Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES

Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:YES

Health Hazards Acute and Chronic:ACUTE/CHRONIC: HARMFUL/FATAL IF
SWALLOWED/ASPIRATED. LONG TERM EXPOS TO VAPS HAS CAUSED CANCER IN
SOME LAB ANIMALS. INGEST MAY CAUSE GI DISTURB. ASPIR INTO LUNGS MAY
CAUSE PNEUM. PRLNGD CONT W/SKIN MA Y RSLT IN DEFAT/RED, ITCH,
INFLAMM, CRACK & POSS SECONDARY INFECTION. HAS A LOW ORDER OF ACUTE
ORAL TOX(EFTS OF OVEREXP)

Explanation of Carcinogenicity:BENZENE: OSHA REG 29 CFR 1910.1028, REV
JUL 92; KNOWN CARCINOGEN (NTP) NTP 6TH ANN RPT, 1991; IARC
2B,VOL45,P159,1989.

Effects of Overexposure:HLTH HAZ:IF INGESTED, BUT MIN AMTS ASPIRATED
DURING SUCH INGEST MAY CAUSE DEATH. HIGH PRESS SKIN INJECTIONS ARE
SERIOUS MED EMER! RPTD/PRLNGD EXPOS TO VAPS CNTNG HIGH CONC OF
BENZENE MAY CAUSE ANEMIA & OTHER BLOOD DISEASES, INCL LEUKEMIA.
BENZENE IS RECOGNIZED AS HAVING POTNTL TO INDUCE ANEMIA & OTHER
BLOOD (ING 11)

Medical Cond Aggravated by Exposure:OPEN WOUNDS, SKIN DISORDERS,
CHRONIC RESPIRATORY DISEASE OR PRE-EXISTING CENTRAL NERVOUS SYSTEM

DISEASE.

=====
 ===== First Aid Measures =====

First Aid:INHAL: REMOVE TO FRESH AIR, PROVIDE OXYGEN THERAPY &/OR RESUSCITATION AS INDICATED. SKIN: REMOVE CONTAMINATED CLOTHING & FLUSH WITH SOAP AND WATER. EYE: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. INGES T: RINSE MOUTH W/WATER. KEEP CALM AND WARM. DO NOT INDUCE VOMIT! ASPIRATION OF MATERIAL INTO LUNGS MAY CAUSE CHEMICAL PNEUMONIA. CALL PHYSICIAN IMMEDIATELY.

=====
 ===== Fire Fighting Measures =====

Flash Point Method:TCC
 Flash Point:-40F,-40C
 Lower Limits:1.4%
 Upper Limits:7.4%
 Extinguishing Media:ANY APPRVD EXTING AGENT FOR CLASS B FIRES, DRY CHEM, FOAM, CARBON DIOXIDE/HALON. WATER IS NOT ORD EFTIVE. (SUPP DATA)
 Fire Fighting Procedures:NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP. AVOID INHAL OF VAPS. WATER SHOULD BE USED TO KEEP EXPOS CONTRS COOL. APPROACH FROM UPWIND IF POSSIBLE.
 Unusual Fire/Explosion Hazard:CLASS 1A FLAMM LIQ. KEEP AWAY FROM HEAT, SOURCES OF IGNIT & OXIDIZERS. BURNING MAY CAUSE EMISSION OF TOX PROD OF COMBUST. EMPTY PROD CNTRS/VESSELS (SUPP DATA)

=====
 ===== Accidental Release Measures =====

Spill Release Procedures:CNTN ALL SPILLS. ABSORB ALL FREE LIQ. REMOVE ALL IGNIT SOURCES & SAFELY STOP FLOW OF SPILL. PVNT FROM ENTERING ALL BODIES OF WATER. COMPLY W/ALL APPLIC LAWS & REGS. ABSORB MATL, PADS, SAND/EARTH MAY B E USED. CONTAM WATER/SOIL MAY BE HAZ TO(ING 17)
 Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

=====
 ===== Handling and Storage =====

Handling and Storage Precautions:KEEP AWAY FROM HEAT, SPARKS & OPEN FLAME. AVOID BRTHG VAP/MIST. AVOID SKIN/EYE CONTACT. KEEP CONTAINERS CLOSED & PLAINLY LABELED.
 Other Precautions:TRANSFER LINES MUST BE BONDED & GROUNDED TO PVNT POTNTL ACCUMULATION OF STATIC ELEC. NO SMOKING IN AREAS OF HNDLG/STOR. STOR SHOULD BE IN TIGHTLY CLSD CONTRS IN COOL, DRY, ISOLATED & WELL VENTD AREA A WAY FROM POTNTL SOURCE OF (ING 21)

=====
 ===== Exposure Controls/Personal Protection =====

Respiratory Protection:NIOSH/MSHA APPRVD SELF CNTND, POSITIVE PRESSURE, BREATHING APPARATUS IN CONFINED SPACES/WHEN EXPOSED TO HEAVY MIST.
 Ventilation:LOCAL EXHAUST: GENERALLY NOT REQD. MECH(GEN): EXPLOSION PROOF (APPROVED FOR CLASSIFIED AREA). SPECIAL: NONE REQUIRED.
 Protective Gloves:IMPERVIOUS.
 Eye Protection:CHEM WORK GOG OR FULL LNGTH FSHLD.
 Other Protective Equipment:IMPERVIOUS CLOTHING AS REQUIRED TO PREVENT SKIN CONTACT. EYE WASH/BATH READILY AVAILABLE WHERE EYE CONTACT IS POSSIBLE.
 Work Hygienic Practices:WASH SKIN THORO W/SOAP & WATER BEFORE EATING, DRINK/SMOKING. VENT MAY BE USED TO CTL/REDUCE AIRBORNE CONC. STAND(ING 25)

Supplemental Safety and Health

VP: 275-475@68F (VARIES SEASONALLY). APPEAR/ODOR: (CLEAR RED, BRONZE & YELLOW ARE TYPICAL). EXTING MEDIA: HOWEVER, WATER FOG MAY BE USED BY EXPER FIRE FIGHTERS FOR INTENSITY CTL, & TO COOL EXPOSED ARE AS. EXPLO HAZ: MAY CNTN EXPLOS VAPS. DONOT PRESSURIZE, CUT, HEAT, WELD/EXPOSE SUCH CONTRS/VESSELS TO SOURCE OF (ING 8)

===== Physical/Chemical Properties =====

Boiling Pt:B.P. Text:>85F,>29.4C
Vapor Pres:SUPP DATA
Vapor Density:3-4
Spec Gravity:0.76(H*20=1)
Evaporation Rate & Reference:10-11(BUTYL ACETATE=1)
Solubility in Water:SLIGHT
Appearance and Odor:CLEAR LIQ W/CHARACT AROMATIC ODOR.MAY BE DYED FOR IDENTIFICATION (SUPP DATA)
Percent Volatiles by Volume:100

===== Stability and Reactivity Data =====

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS. COMBINATION OF NITRIC AND SULFURIC ACIDS.
Stability Condition to Avoid:AVOID HANDLING OR STORING NEAR HEAT, SPARKS/OPEN FLAME.
Hazardous Decomposition Products:CONTACT WITH NITRIC AND SULFURIC ACIDS WILL FORM NITROCRESOLS THAT CAN DECOMPOSE VIOLENTLY.

===== Disposal Considerations =====

Waste Disposal Methods:DISPOSE OF PROD & CONTAMD MATL AS EPA "IGNITABLE HAZ WASTE". USE ONLY APPRVD TRTMT TRANSPORTERS & DISP SITE IN COMPLIANCE W/ALL APPLIC FED, ST & LOC REGS . MAINTAIN SURVEILLANCE OF ABSORBED MATL UNTIL FINAL DISP TO OBSERVE FOR EMISSION (ING 20)

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

RegenOx® – Part A (Oxidizer Complex)

Material Safety Data Sheet (MSDS)

Last Revised: June 24, 2010

Section 1 – Supplier Information and Material Identification

Supplier:



REGENESIS

1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description: A mixture of sodium percarbonate [2Na₂CO₃·3H₂O₂], sodium carbonate [Na₂CO₃], sodium silicate and silica gel.

Chemical Family: Inorganic Chemicals

Trade Name: RegenOx® – Part A (Oxidizer Complex)

Product Use: Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>	<u>Percentage</u>
15630-89-4	Sodium Percarbonate	60 -100 %
5968-11-6	Sodium Carbonate Monohydrate	10 – 30 %
7699-11-6	Silicic Acid	< 1 %
63231-67-4	Silica Gel	< 1 %

Section 3 – Physical Data

Form: Powder

Color: White

Odor: Odorless

Melting Point: NA

Boiling Point: NA

Section 3 – Physical Data (cont)

Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm ³
Solubility:	Min 14.5g/100g water @ 20 °C
Viscosity:	NA
pH (3% solution):	≈ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 °C.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	<i>No</i>
Unlisted Substance:	<i>Yes</i>
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

- Storage:** Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.
- Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.
- Protect from moisture. Do not store near combustible materials. Keep containers well sealed.
- Store separately from reducing materials. Avoid contamination which may lead to decomposition.
- Handling:** Avoid contact with eyes, skin and clothing. Use with adequate ventilation.
- Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.
- Label containers and keep them tightly closed when not in use.
- Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)

- Engineering Controls:** General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.
- Respiratory Protection:** For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.
- Hand Protection:** Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & Explosion:	Product is non-explosive. In case of fire, evacuate all non-essential personnel, wear protective clothing and a self-contained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. <u>Do Not</u> induce vomiting.

Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact: Wash affected areas with soap and a mild detergent and large amounts of water.

Section 9 – Accidental Release Measures

Precautions:

Cleanup Methods: Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.

Section 10 – Information on Toxicology

Toxicity Data

LD50 Oral (rat): 2,400 mg/kg
LD50 Dermal (rabbit): Min 2,000 mg/kg
LD50 Inhalation (rat): Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information: NA

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment: Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.

Package (Pail) Treatment: The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name:	Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [2Na ₂ CO ₃ ·3H ₂ O ₂], sodium carbonate [Na ₂ CO ₃], sodium silicate and silica gel.]
UN Number:	1479
Hazard Class:	5.1
Labels:	5.1 (Oxidizer)
Packaging Group:	III

Section 14 – Other Information

HMIS[®] Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS[®] is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

RegenOx® – Part B (Activator Complex)

Material Safety Data Sheet (MSDS)

Last Revised: June 4, 2010

Section 1 – Supplier Information and Material Identification

Supplier:



REGENESIS

1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description: A mixture of sodium silicate solution, silica gel and ferrous sulfate

Chemical Family: Inorganic Chemicals

Trade Name: RegenOx® – Part B (Activator Complex)

Product Use: Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

<u>CAS No.</u>	<u>Chemical</u>
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form: Liquid

Color: Blue/Green

Odor: Odorless

Melting Point: NA

Boiling Point: NA

Flammability/Flash Point: NA

Vapor Pressure: NA

Section 3 – Physical Data (cont)

Specific Gravity	1.39 g/cm ³
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions.
Conditions to Avoid:	None.
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	No
Unlisted Substance:	Yes
SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification	
Extremely Hazardous Substance:	No
SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know	
Hazard Category:	Acute
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage: Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat above 60 degrees C and colder than 10 degrees C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.

Handling: Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation.
Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls: General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.

Respiratory Protection: Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.

Hand Protection: Wear chemical resistant gloves.

Eye Protection: Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.

Skin Protection: Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.

Other:

Protection Against Fire & Explosion: Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	
First Aid	
Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. <u>DO NOT</u> induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:

PPE: Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).

Environmental Hazards: Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.

Cleanup Methods: Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data

Sodium Silicate: When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist.

The acute oral toxicity of this product has not been tested.

Ferrous Sulfate: LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information: Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment: Neutralize and landfill solids in an approved waste facility operated by an authorized contactor in compliance with local regulations.

Package (Pail) Treatment: The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. This product is not regulated as a hazardous material so there are no restrictions.

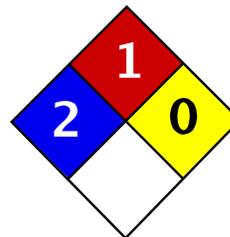
Section 14 – Other Information

HMIS[®] Rating	Health – 2 (moderate)	Reactivity – 0 (none)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat
	Contact – 1 (slight)	

HMIS[®] is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.



Health	2
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet Silver MSDS

Section 1: Chemical Product and Company Identification

Product Name: Silver

Catalog Codes: SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

CAS#: 7440-22-4

RTECS: VW3500000

TSCA: TSCA 8(b) inventory: Silver

CI#: Not applicable.

Synonym:

Chemical Formula: Ag

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

Toxicological Data on Ingredients: Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact: No known effect on skin contact, rinse with water for a few minutes.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not

breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Splash goggles. Lab coat.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (mg/m³) from OSHA (PEL)

TWA: 0.01 (mg/m³) from OSHA NIOSH

Australia: TWA: 0.1 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Solid metallic powder. Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 107.87 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2212°C (4013.6°F)

Melting Point: 961°C (1761.8°F)

Critical Temperature: Not available.

Specific Gravity: 10.4 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Is not dispersed in cold water, hot water.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 100 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Silver

Pennsylvania RTK: Silver

Minnesota: Silver

Massachusetts RTK: Silver

New Jersey: Silver

TSCA 8(b) inventory: Silver

TSCA 8(a) PAIR: Silver

TSCA 8(d) H and S data reporting: Silver

SARA 313 toxic chemical notification and release reporting: Silver: 1%

CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Not applicable.

Lab coat.

Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:26 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.

MSDS Number: **T4940** * * * * * Effective Date: **09/16/09** * * * * * Supersedes: **12/06/07**

MSDS	Material Safety Data Sheet	
	From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	 
24 Hour Emergency Telephone: 908-859-2151 CHEMTREC: 1-800-424-9300		National Response in Canada CANUTEC: 613-996-6666
Outside U.S. and Canada Chemtrec: 703-527-3887		NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2637) for assistance.		

TRICHLOROETHYLENE

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
CAS No.: 79-01-6
Molecular Weight: 131.39
Chemical Formula: C₂HCl₃
Product Codes:
 J.T. Baker: 5376, 9454, 9458, 9464, 9473
 Mallinckrodt: 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Poison)
 Flammability Rating: 1 - Slight
 Reactivity Rating: 1 - Slight
 Contact Rating: 3 - Severe
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
 Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage.

Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F)

Flammable limits in air % by volume:

lcl: 8; ucl: 12.5

Explosion:

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO₂, dry chemical or foam.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Trichloroethylene:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA), 200 ppm (Ceiling),

300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV):

10 ppm (TWA) 25 ppm (STEL); A2 Suspected Human Carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:

Chloroform-like odor.

Solubility:

Practically insoluble in water. Readily miscible in organic solvents.

Specific Gravity:

1.47 @ 20C/4C

pH:

No information found.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

87C (189F)

Melting Point:

-73C (-99F)

Vapor Density (Air=1):

4.5

Vapor Pressure (mm Hg):

57.8 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

Conditions to Avoid:

Heat, flame, ignition sources, light, moisture, incompatibles

11. Toxicological Information

Toxicological Data:

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

This material has been linked to mutagenic effects in humans.

Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE
Hazard Class: 6.1
UN/NA: UN1710
Packing Group: III
Information reported for product/size: 4L

15. Regulatory Information

```
-----\Chemical Inventory Status - Part 1\-----
Ingredient                               TSCA  EC   Japan  Australia
-----
Trichloroethylene (79-01-6)              Yes  Yes  Yes    Yes
```

```
-----\Chemical Inventory Status - Part 2\-----
Ingredient                               --Canada--
Korea  DSL  NDSL  Phil.
-----
Trichloroethylene (79-01-6)              Yes  Yes  No     Yes
```

```
-----\Federal, State & International Regulations - Part 1\-----
-SARA 302-  -SARA 313-
Ingredient  RQ  TPQ  List  Chemical Catg.
-----
Trichloroethylene (79-01-6)              No  No   Yes   No
```

```
-----\Federal, State & International Regulations - Part 2\-----
-RCRA-  -TSCA-
Ingredient  CERCLA  261.33  8 (d)
-----
Trichloroethylene (79-01-6)              100     U228    No
```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: None allocated.

Poison Schedule: S6

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat and flame.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

Product Use:

Laboratory Reagent.

Revision Information:

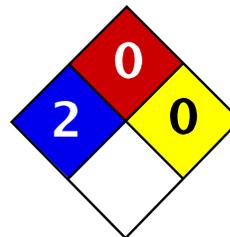
No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY,

MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂-Cl₄

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States]
TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States]
TWA: 170 (mg/m³) from OSHA (PEL) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane.

It dissolves in most of the fixed and volatile oils.

Solubility in water: 0.015 g/100 ml @ 25 deg. C

It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents.

Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium.

Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 2629 mg/kg [Rat].

Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract,

skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation.
Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc:
LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg
LDL [Dog] - Route: Oral; Dose: 4000 mg/kg
LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects(teratogenic).
May affect genetic material (mutagenic).
May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:
Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain.
Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema
Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation.
Chronic Potential Health Effects:
Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation.
Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

Tetrachloroethylene

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene

Connecticut hazardous material survey.: Tetrachloroethylene

Illinois toxic substances disclosure to employee act: Tetrachloroethylene

Illinois chemical safety act: Tetrachloroethylene

New York release reporting list: Tetrachloroethylene

Rhode Island RTK hazardous substances: Tetrachloroethylene

Pennsylvania RTK: Tetrachloroethylene

Minnesota: Tetrachloroethylene

Michigan critical material: Tetrachloroethylene

Massachusetts RTK: Tetrachloroethylene

Massachusetts spill list: Tetrachloroethylene

New Jersey: Tetrachloroethylene

New Jersey spill list: Tetrachloroethylene

Louisiana spill reporting: Tetrachloroethylene

California Director's List of Hazardous Substances: Tetrachloroethylene

TSCA 8(b) inventory: Tetrachloroethylene

TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97

SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene

CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects.

R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S23- Do not breathe gas/fumes/vapour/spray

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S37- Wear suitable gloves.

S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information

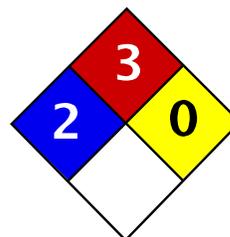
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C₆-H₅-CH₃ or C₇-H₈

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

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

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks, of heat.

Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water.

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide;

concentrated nitric acid, sulfuric acid + nitric acid; N₂O₄; AgClO₄; BrF₃; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States]

TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN

TWA: 100 STEL: 150 from NIOSH [United States]

TWA: 375 STEL: 560 (mg/m³) from NIOSH [United States]

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 2.7$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Soluble in diethyl ether, acetone.

Practically insoluble in cold water.

Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide.

Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride.

Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C.

Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 636 mg/kg [Rat].

Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose:

LDL [Human] - Route: Oral; Dose: 50 mg/kg

LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin.

Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abrasions. This usually resolves in 2 days.

Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite.

Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation.

Chronic Potential Health Effects:

Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophosphatemia), severe, muscle weakness and Rhabdomyolysis.

Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)], 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may

arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene

California prop. 65 (no significant risk level): Toluene: 7 mg/day (value)

California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value)

California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene

Connecticut hazardous material survey.: Toluene

Illinois toxic substances disclosure to employee act: Toluene

Illinois chemical safety act: Toluene

New York release reporting list: Toluene

Rhode Island RTK hazardous substances: Toluene

Pennsylvania RTK: Toluene

Florida: Toluene

Minnesota: Toluene

Michigan critical material: Toluene

Massachusetts RTK: Toluene

Massachusetts spill list: Toluene

New Jersey: Toluene

New Jersey spill list: Toluene

Louisiana spill reporting: Toluene

California Director's List of Hazardous Substances.: Toluene

TSCA 8(b) inventory: Toluene

TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92

SARA 313 toxic chemical notification and release reporting: Toluene

CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable.

R20- Harmful by inhalation.

S16- Keep away from sources of ignition - No smoking.

S25- Avoid contact with eyes.

S29- Do not empty into drains.

S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 11/06/2008 12:00 PM

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 ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.



Material Safety Data Sheet

MSDS ID NO.: 0127MAR019
Revision date: 12/07/2010

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon Regular Unleaded Gasoline
Synonym: Conventional Regular Unleaded Gasoline
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LP
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having carbon numbers predominantly greater than C3 and boiling in the range of 85-500 F. Can contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon Regular Unleaded Gasoline	86290-81-5	100	300 ppm TWA 500 ppm STEL		

Component Information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Saturated Hydrocarbons	Mixture	55-85			

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Aromatic Hydrocarbons	Mixture	10-40			
Unsaturated Hydrocarbons	Mixture	1-15			
Toluene	108-88-3	1-15	20 ppm TWA	= 100 ppm TWA = 375 mg/m ³ TWA = 150 ppm STEL = 560 mg/m ³ STEL	
Xylene	1330-20-7	2-10	100 ppm TWA 150 ppm STEL	= 100 ppm TWA = 435 mg/m ³ TWA = 150 ppm STEL = 655 mg/m ³ STEL	
1,2,4-Trimethylbenzene	95-63-6	1-5	= 25 ppm TWA	= 125 mg/m ³ TWA = 25 ppm TWA	
Benzene	71-43-2	0.5-3.5	Skin - potential significant contribution to overall exposure by the cutaneous route 0.5 ppm TWA 2.5 ppm STEL	= 25 ppm Ceiling = 10 ppm TWA = 50 ppm STEL	OSHA Exposure Limit as specified in 1910.1028: = 1.0 ppm TWA = 5 ppm STEL = 0.5 ppm Action Level
Hexane	110-54-3	0-3	Skin - potential significant contribution to overall exposure by the cutaneous route 50 ppm TWA	= 180 mg/m ³ TWA = 50 ppm TWA	
Ethyl Benzene	100-41-4	0.5-2.0	100 ppm TWA 125 ppm STEL	= 100 ppm TWA = 435 mg/m ³ TWA = 125 ppm STEL = 545 mg/m ³ STEL	
Naphthalene	91-20-3	0.1-0.5	Skin - potential significant contribution to overall exposure by the cutaneous route 10 ppm TWA 15 ppm STEL	= 10 ppm TWA = 50 mg/m ³ TWA = 15 ppm STEL = 75 mg/m ³ STEL	

Notes:

The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER!

FUMES MAY CAUSE EYE AND RESPIRATORY IRRITATION.
MAY BE HARMFUL OR FATAL IF SWALLOWED
MAY CAUSE LUNG DAMAGE
OVEREXPOSURE MAY CAUSE CNS DEPRESSION
BREATHING HIGH CONCENTRATIONS CAN CAUSE IRREGULAR HEARTBEATS WHICH MAY BE FATAL

DANGER - CONTAINS BENZENE - MAY CAUSE CANCER
CAN CAUSE LEUKEMIA AND OTHER BLOOD DISORDERS.
POTENTIAL REPRODUCTIVE HAZARD
SEE TOXICOLOGICAL INFORMATION SECTION FOR MORE INFORMATION

EXTREMELY FLAMMABLE LIQUID AND VAPOR
VAPOR MAY CAUSE FLASH FIRE OR EXPLOSION
MATERIAL MAY ACCUMULATE STATIC CHARGE

STABLE

Inhalation:

Breathing high concentrations may be harmful.

May cause central nervous system depression or effects. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

Breathing high concentrations of this material, for example, in a confined space or by intentional abuse, can cause irregular heartbeats which can cause death. See Toxicological Effects (Section 11) for more information.

Ingestion:

Swallowing this material may be harmful.

May cause irritation of the mouth, throat and gastrointestinal tract.

May cause central nervous system depression or effects. Symptoms may include salivation, pain, nausea, vomiting and diarrhea. Exposure may also cause central nervous system symptoms similar to those listed under "Inhalation" (see Inhalation section).

Skin contact:

Contact may cause reddening, itching and inflammation.

Skin contact may cause harmful effects in other parts of the body.

Eye contact:

Contact may cause pain and severe reddening and inflammation of the conjunctiva.

Effects may become more serious with repeated or prolonged contact.

Carcinogenic Evaluation:

Product information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon Regular Unleaded Gasoline 86290-81-5	A2 - Possible Human Carcinogen		A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans	

Notes:

The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of gasoline in humans. IARC determined that limited evidence of carcinogenicity in animals exists. IARC's overall evaluation of gasoline, in spite of limited carcinogenicity evidence, has resulted in the IARC designation of gasoline as possibly carcinogenic to humans (Group 2B) because gasoline contains benzene.

IARC has determined that there is inadequate evidence for the carcinogenicity of gasoline engine exhaust in humans or animals. However, IARC's overall evaluation on gasoline engine exhaust, in spite of the absence of carcinogenicity data, has resulted in the IARC designation of gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) because of the presence of certain engine exhaust components.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Toluene 108-88-3		male rat-no evidence; female rat-no evidence; male mice-no evidence; female mice-no evidence	A4 - Not Classifiable as a Human Carcinogen	
Xylene 1330-20-7		male rat-no evidence; female rat-no evidence; male mice-no evidence; female mice-no evidence	A4 - Not Classifiable as a Human Carcinogen	
Benzene 71-43-2	Supplement 7 [1987], Monograph 29 [1982]	Known Human Carcinogen male rat-clear evidence; female rat-clear evidence; male mice-clear evidence; female mice-clear evidence	A1 - Confirmed Human Carcinogen	Present
Ethyl Benzene 100-41-4	Monograph 77 [2000]	male rat-clear evidence; female rat-some evidence; male mice-some evidence; female mice-some evidence	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans	Present
Naphthalene 91-20-3	Monograph 82 [2002]	Reasonably Anticipated To Be A Human Carcinogen male rat-clear evidence; female rat-clear evidence; male mice-no evidence; female mice-some evidence	A4 - Not Classifiable as a Human Carcinogen	Present

Notes:

The International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and OSHA have determined that there is sufficient evidence for the carcinogenicity of benzene in humans (Group 1A).

The International Agency for Research on Cancer (IARC) has determined that there is sufficient evidence for the carcinogenicity of alcoholic beverages (ethanol) in humans (Group 1).

The International Agency for Research on Cancer (IARC) has concluded that ethyl benzene is possibly carcinogenic to humans (Group 2B).

The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene is a possible human carcinogen.

4. FIRST AID MEASURES

Eye Contact:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. GET IMMEDIATE MEDICAL ATTENTION.

Skin Contact:

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention if irritation persists. Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties.

Ingestion:

Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest.
GET IMMEDIATE MEDICAL ATTENTION.

Inhalation:

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest.
GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN:

INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

INGESTION: If ingested this material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

Medical Conditions Aggravated By Exposure:

blood (anemia), bone marrow,
blood-forming organs, skin, respiratory system, lungs, liver, kidney,

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:

For small fires, Class B fire extinguishing media such as CO₂, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

5. FIRE FIGHTING MEASURES

Specific hazards:

This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard, and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters:

Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point:

-50 F

Autoignition temperature:

CA 495 F

Flammable limits in air - lower (%):

1.4

Flammable limits in air - upper (%):

7.6

NFPA rating:

Health: 1

Flammability: 3

Instability: 0

Other: -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues. Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

For use as a motor fuel only. Product should never be used as a solvent due to its flammable and potentially toxic properties. Siphoning by mouth can result in lung aspiration which can be harmful or fatal.

Portable containers of 12 gallons (45 liters) or less should never be filled while they are in or on a motor vehicle or marine craft. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. Containers should be placed on the ground. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers. A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling. Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

- Engineering measures:** Local or general exhaust required in an enclosed area or when there is inadequate ventilation.
- Respiratory protection:** Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the TWA or STEL. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 1910.134. Self-contained breathing apparatus should be used for fire fighting.
- Skin and body protection:** Use nitrile rubber, viton or PVA gloves for repeated or prolonged skin exposure.
- Eye protection:** No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.
- Hygiene measures:** No special protective clothing is normally required. Select protective clothing depending on industrial operations. Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Clear Or Colored Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Clear or Colored
Odor:	Strong Hydrocarbon
Molecular weight:	100
pH:	Neutral
Boiling point/range (5-95%):	90-437 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Specific gravity:	0.70-0.77
Density:	5.9-6.3 lbs/gal
Bulk density:	No data available.
Vapor density:	3-4
Vapor pressure:	Not determined.
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	2.13-4.5
VOC content(%):	100%
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, chlorates, peroxides.
Conditions to avoid:	Excessive heat, sources of ignition, open flame.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon Regular Unleaded Gasoline	86290-81-5	>10,000 ppm [Dog]	>5 ml/kg [Rabbit]	>14 ml/kg [Rat]

Toxicology Information:

BENZENE: Studies of Workers Overexposed to Benzene: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a Case-Control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC.

The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor

skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with Glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to

naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of consciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs.

Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffers Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

TARGET ORGANS:

central nervous system, brain, peripheral nervous system, auditory system, respiratory system, mucous membranes, lungs, skin, eyes, heart, blood forming organs, bone marrow, reproductive organs, testes, immune system, lymphatics, thymus, thyroid, pituitary gland,

12. ECOTOXICOLOGICAL INFORMATION

Mobility:

May partition into air, soil and water.

Ecotoxicity:

Toxic to aquatic organisms.

Bioaccumulation:

Not expected to bioaccumulate in aquatic organisms.

Persistence/Biodegradation:

Readily biodegradable in the environment.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "characteristic" hazardous waste. This product could also contain benzene at >0.5 ppm and could exhibit the characteristics of "toxicity" as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Gasoline
UN/Identification No:	UN 1203
Hazard Class:	3
Packing group:	II
DOT reportable quantity (lbs):	Not applicable.

Proper shipping name:	Gasoline
UN/Identification No:	UN 1203
Hazard Class:	3
Packing group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b):

This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard:

This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302:

This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Toluene	NA
Xylene	NA
1,2,4-Trimethylbenzene	NA
Benzene	NA
Hexane	NA
Ethyl Benzene	NA
Naphthalene	NA

SARA Section 304:

This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Toluene	= 454 kg final RQ
Xylene	= 100 lb final RQ = 45.4 kg final RQ
1,2,4-Trimethylbenzene	NA
Benzene	= 10 lb final RQ = 4.54 kg final RQ
Hexane	= 2270 kg final RQ = 5000 lb final RQ
Ethyl Benzene	= 1000 lb final RQ = 454 kg final RQ
Naphthalene	= 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312

The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313:

This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Saturated Hydrocarbons	None
Aromatic Hydrocarbons	None
Unsaturated Hydrocarbons	None

Name	CERCLA/SARA 313 Emission reporting:
Toluene	= 1.0 % de minimis concentration
Xylene	= 1.0 % de minimis concentration
1,2,4-Trimethylbenzene	= 1.0 % de minimis concentration
Benzene	= 0.1 % de minimis concentration
Hexane	= 1.0 % de minimis concentration
Ethyl Benzene	= 0.1 % de minimis concentration
Naphthalene	= 0.1 % de minimis concentration

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

Saturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Aromatic Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Unsaturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed

Saturated Hydrocarbons

New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	developmental toxicity, initial date 1/1/91
New Jersey Right-To-Know:	sn 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan critical materials register list:	= 100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree; teratogen
New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb RQ land/water = 1000 lb RQ air

Xylene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan critical materials register list:	= 100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree

Saturated Hydrocarbons

New Jersey - Environmental Hazardous Substances List: SN 2014 TPQ 500 lb
Illinois - Toxic Air Contaminants Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances: = 1 lb RQ land/water
= 1000 lb RQ air

1,2,4-Trimethylbenzene

Louisiana Right-To-Know: Not Listed
California Proposition 65: Not Listed
New Jersey Right-To-Know: sn 2716
Pennsylvania Right-To-Know: Environmental hazard
Massachusetts Right-To-Know: Present
Florida substance List: Not Listed.
Rhode Island Right-To-Know: Toxic
Michigan critical materials register list: Not Listed.
Massachusetts Extraordinarily Hazardous Substances: Not Listed
California - Regulated Carcinogens: Not Listed
Pennsylvania RTK - Special Hazardous Substances: Not Listed
New Jersey - Special Hazardous Substances: Not Listed
New Jersey - Environmental Hazardous Substances List: SN 2716 TPQ 500 lb
Illinois - Toxic Air Contaminants Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances: Not Listed

Benzene

Louisiana Right-To-Know: Not Listed
California Proposition 65: carcinogen, initial date 2/27/87
developmental toxicity, initial date 12/26/97
male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know: sn 0197
Pennsylvania Right-To-Know: Environmental hazard; Special hazardous substance
Massachusetts Right-To-Know: Carcinogen; Extraordinarily hazardous
Florida substance List: Not Listed.
Rhode Island Right-To-Know: Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan critical materials register list: = 100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances: carcinogen; extraordinarily hazardous
California - Regulated Carcinogens: Not Listed
Pennsylvania RTK - Special Hazardous Substances: Present
New Jersey - Special Hazardous Substances: carcinogen; flammable - third degree; mutagen; teratogen
New Jersey - Environmental Hazardous Substances List: SN 0197 TPQ 500 lb
Illinois - Toxic Air Contaminants Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances: = 1 lb RQ land/water
= 10 lb RQ air

Hexane

Louisiana Right-To-Know: Not Listed
California Proposition 65: Not Listed
New Jersey Right-To-Know: sn 1340
Pennsylvania Right-To-Know: Present
Massachusetts Right-To-Know: Present

Saturated Hydrocarbons

Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb RQ air = 1 lb RQ land/water

Ethyl Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	sn 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	carcinogen; flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ 500 lb
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb RQ land/water = 1000 lb RQ air

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	sn 1322
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	carcinogen

Saturated Hydrocarbons

New Jersey - Environmental Hazardous Substances List:

SN 1322 TPQ 500 lb

Illinois - Toxic Air Contaminants

Present

New York - Reporting of Releases Part 597 - List of Hazardous Substances:

= 1 lb RQ land/water
= 100 lb RQ air

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Toluene	B2, D2A, D2B	1 %
Xylene	B2, D2A, D2B	
1,2,4-Trimethylbenzene	B3	0.1 %
Benzene	B2, D2A, D2B	0.1 %
Hexane	B2, D2A	1 %
Ethyl Benzene	B2, D2A, D2B	0.1 %
Naphthalene	B4, D2A	1 %

NOTE: Not Applicable.

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Mark S. Swanson, Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LP (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet



[Division of Facilities Services](#)

DOD Hazardous Material Information (ANSI Format) For Cornell University Convenience Only

XYLENE

Section 1 - Product and Company Identification	Section 9 - Physical & Chemical Properties
Section 2 - Composition/Information on Ingredients	Section 10 - Stability & Reactivity Data
Section 3 - Hazards Identification Including Emergency Overview	Section 11 - Toxicological Information
Section 4 - First Aid Measures	Section 12 - Ecological Information
Section 5 - Fire Fighting Measures	Section 13 - Disposal Considerations
Section 6 - Accidental Release Measures	Section 14 - MSDS Transport Information
Section 7 - Handling and Storage	Section 15 - Regulatory Information
Section 8 - Exposure Controls & Personal Protection	Section 16 - Other Information

The information in this document is compiled from information maintained by the United States Department of Defense (DOD). Anyone using this information is solely responsible for the accuracy and applicability of this information to a particular use or situation.

Cornell University does not in any way warrant or imply the applicability, viability or use of this information to any person or for use in any situation.

Section 1 - Product and Company Identification XYLENE

Product Identification: XYLENE

Date of MSDS: 01/01/1987 **Technical Review Date:** 06/26/1999

FSC: 6810 **NIIN:** 00-584-4071

Submitter: D DG

Status Code: C

MFN: 01

Article: N

Kit Part: N

Manufacturer's Information

Manufacturer's Name: PHIPPS PRODUCTS CORP
Manufacturer's Address1: 186 LINCOLN ST SUITE 502
Manufacturer's Address2: BOSTON, MA 02111-2403
Manufacturer's Country: US
General Information Telephone:
Emergency Telephone: NONE
Emergency Telephone: NONE
MSDS Preparer's Name: N/P
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 86511
Special Project Code: N

Item Description

Item Name: XYLENE, TECHNICAL
Item Manager: S9G
Specification Number: 81345-ASTM D 846
Type/Grade/Class: NONE
Unit of Issue: QT
Unit of Issue Quantity: G
Type of Container: GLASS

Contractor Information

Contractor's Name: PHIPPS PRODUCTS CORP
Contractor's Address1: 186 LINCOLN ST SUITE 502
Contractor's Address2: BOSTON, MA 02111-2403
Contractor's Telephone: OUT OF BUSINESS
Contractor's CAGE: 86511

Section 2 - Composition/Information on Ingredients

XYLENE

Ingredient Name: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient CAS Number: 1330-20-7 **Ingredient CAS Code:** M
RTECS Number: ZE2100000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: 100

% Environmental Weight:
Other REC Limits: N/P
OSHA PEL: 100 PPM/150 STEL **OSHA PEL Code:** M
OSHA STEL: **OSHA STEL Code:**
ACGIH TLV: 100 PPM/150STEL;9192 **ACGIH TLV Code:** M
ACGIH STEL: N/P **ACGIH STEL Code:**
EPA Reporting Quantity: 1000 LBS
DOT Reporting Quantity: 1000 LBS
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview

XYLENE

Health Hazards Acute & Chronic: N/P

Signs & Symptoms of Overexposure:
IRRITATING RESPIRATORY TRACT.MAY CAUSE DIZZINESS,UNCONSCIOUSNESS,OR COMA.

Medical Conditions Aggravated by Exposure:
N/P

LD50 LC50 Mixture: N/P

Route of Entry Indicators:
Inhalation: N/P
Skin: N/P
Ingestion: N/P

Carcenogenicity Indicators
NTP: N/P
IARC: N/P
OSHA: N/P

Carcinogenicity Explanation: N/P

Section 4 - First Aid Measures

XYLENE

First Aid:
INHALE:REMOVE TO FRESH AIR, GIVE CPR/O*2 IF NEED;EYES/SKIN:FLUSH W LG AMTS H*2O FOR 15 MIN;INGEST:RINSE MOUTH; GET MEDICAL ATTENTION FOR EYES, BREATHING DIFFICULTY, OR OTHER SYMPTOMS OF OVEREXPOSURE.

Section 5 - Fire Fighting Measures

XYLENE

Fire Fighting Procedures:
USE NIOSH APPROVED SCBA TO FIGHT FIRES.COOL CNTNRS W.WATER
Unusual Fire or Explosion Hazard:

KEEP AWAY FROM HEAT AND OPEN FLAME.CLOSED CONTAINERS MAY EXPLODE IF EXPOSED TO EXTREME HEAT.

Extinguishing Media:

DRY CHEMICAL,CO*2,FOAM.

Flash Point: Flash Point Text: 28C/82F (T.C.C.)

Autoignition Temperature:

Autoignition Temperature Text: N/A

Lower Limit(s): 1.1

Upper Limit(s):

Section 6 - Accidental Release Measures

XYLENE

Spill Release Procedures:

ISOLATE FROM SOURCE OF IGNITION.USE PERSONAL PROTECTION EQUIPMENT.COLLECT LEAKING LIQUID IN A SEALABLE CONTAINER,ABSORB SPILLED LIQUID IN SAND OR INERT ABSORBENT AND RECOVER IT FOR FURHTER DISPOSAL.

Section 7 - Handling and Storage

XYLENE

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection

XYLENE

Respiratory Protection:

USE NIOSH APPROVED RESPIRATOR XYLENE,IF IN EXCESS OF TLV.

Ventilation:

PROVIDE MECHAN(GEN/LOCAL EXHAUST)VENT TO MAINTN **Protective Gloves:**
IMPERVIOUS

Eye Protection: SAFETY/CHEM GOGGLES

Other Protective Equipment: FULL PROTECTIVE CLOTHING,SAFETY SHOWER,EYE WASH STATION

Work Hygenic Practices: N/P

Supplemental Health & Safety Information: MSDS DATED 5/19/83

Section 9 - Physical & Chemical Properties

XYLENE

HCC: F3

NRC/State License Number:

Net Property Weight for Ammo:

Boiling Point: Boiling Point Text: 139C/283F

Melting/Freezing Point: Melting/Freezing Text: N/A

Decomposition Point: Decomposition Text: N/A

Vapor Pressure: 9.5 **Vapor Density:** 9.5

Percent Volatile Organic Content:
Specific Gravity: 0.870
Volatile Organic Content Pounds per Gallon:
pH: N/P
Volatile Organic Content Grams per Liter:
Viscosity: N/P
Evaporation Weight and Reference: 11.0 (ETHER=1)
Solubility in Water: NEGLIGIBLE
Appearance and Odor: CLEAR, WATER LIKE LIQUID
Percent Volatiles by Volume: 100
Corrosion Rate: N/P

Section 10 - Stability & Reactivity Data
XYLENE

Stability Indicator: YES
Materials to Avoid:
STRONG OXIDIZERS.
Stability Condition to Avoid:
EXTREME HEAT.
Hazardous Decomposition Products:
INCOMPLETE COMBUSTION MAY GIVE CO AND/OR CO*2.
Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NONE SPECIFIED BY THE MFR.

Section 11 - Toxicological Information
XYLENE

Toxicological Information:
N/P

Section 12 - Ecological Information
XYLENE

Ecological Information:
N/P

Section 13 - Disposal Considerations
XYLENE

Waste Disposal Methods:
CONSULT LOCAL AUTHORITIES. DISPOSAL MUST BE IAW LOCAL, STATE AND FEDERAL REGULATIONS.

Section 14 - MSDS Transport Information
XYLENE

Transport Information:
N/P

Section 15 - Regulatory Information

XYLENE

SARA Title III Information:

N/P

Federal Regulatory Information:

N/P

State Regulatory Information:N/P

Section 16 - Other Information**XYLENE**

Other Information:

N/P

HMIS Transportation Information**Product Identification:** XYLENE**Transportation ID Number:** 78109**Responsible Party CAGE:** 86511**Date MSDS Prepared:** 01/01/1987**Date MSDS Reviewed:** 07/19/1988**MFN:** 07/19/1988**Submitter:** D DG**Status Code:** C**Container Information****Unit of Issue:** QT**Container Quantity:** G**Type of Container:** GLASS**Net Unit Weight:****Article without MSDS:** N**Technical Entry NOS Shipping Number:** XYLOL**Radioactivity:****Form:****Net Explosive Weight:****Coast Guard Ammunition Code:****Magnetism:** N/P**AF MMAC Code:****DOD Exemption Number:****Limited Quantity Indicator:****Multiple Kit Number:** 0**Kit Indicator:** N**Kit Part Indicator:** N**Review Indicator:** Y**Additional Data:****Department of Transportation Information****DOT Proper Shipping Name:** XYLENES**DOT PSN Code:** PWS**Symbols:**

DOT PSN Modifier:**Hazard Class:** 3**UN ID Number:** UN1307**DOT Packaging Group:** III**Label:** FLAMMABLE LIQUID**Special Provision(s):** B1,T1**Packaging Exception:** 150**Non Bulk Packaging:** 203**Bulk Packaging:** 242**Maximum Quantity in Passenger Area:** 60 L**Maximum Quantity in Cargo Area:** 220 L**Stow in Vessel Requirements:** A**Requirements Water/Sp/Other:****IMO Detail Information****IMO Proper Shipping Name:** XYLOLS**IMO PSN Code:** PPN**IMO PSN Modifier:****IMDG Page Number:** SEE 3292**UN Number:** 1307**UN Hazard Class:** 3.2**IMO Packaging Group:** II**Subsidiary Risk Label:** -**EMS Number:** 3-07**Medical First Aid Guide Number:** 310**IATA Detail Information****IATA Proper Shipping Name:** XYLENES**IATA PSN Code:** ZPL**IATA PSN Modifier:****IATA UN Id Number:** 1307**IATA UN Class:** 3**Subsidiary Risk Class:****UN Packaging Group:** III**IATA Label:** FLAMMABLE LIQUID**Packaging Note for Passengers:** 309**Maximum Quantity for Passengers:** 60L**Packaging Note for Cargo:** 310**Maximum Quantity for Cargo:** 220L**Exceptions:****AFI Detail Information****AFI Proper Shipping Name:** XYLENES**AFI Symbols:****AFI PSN Code:** ZPL**AFI PSN Modifier:****AFI UN Id Number:** UN1307**AFI Hazard Class:** 3**AFI Packing Group:** III**AFI Label:****Special Provisions:** P5**Back Pack Reference:** A7.3**HAZCOM Label Information****Product Identification:** XYLENE

CAGE: 86511
Assigned Individual: N
Company Name: PHIPPS PRODUCTS CORP
Company PO Box:
Company Street Address1: 186 LINCOLN ST SUITE 502
Company Street Address2: BOSTON, MA 02111-2403 US
Health Emergency Telephone:
Label Required Indicator: Y
Date Label Reviewed: 12/16/1998
Status Code: C
Manufacturer's Label Number:
Date of Label: 12/16/1998
Year Procured: N/K
Organization Code: F
Chronic Hazard Indicator: N/P
Eye Protection Indicator: N/P
Skin Protection Indicator: N/P
Respiratory Protection Indicator: N/P
Signal Word: N/P
Health Hazard:
Contact Hazard:
Fire Hazard:
Reactivity Hazard:

8/7/2002 11:32:48 PM

E I DU PONT DE NEMOURS & CO INC -- ZINC METAL -- 9650-00N056501

===== Product Identification =====

Product ID:ZINC METAL
 MSDS Date:12/31/1985
 FSC:9650
 NIIN:00N056501
 MSDS Number: BWGBT
 === Responsible Party ===
 Company Name:E I DU PONT DE NEMOURS & CO INC
 Address:1007 MARKET ST
 City:WILMINGTON
 State:DE
 ZIP:19898
 Country:US
 Info Phone Num:800-962-9919
 Emergency Phone Num:800-424-9300 (CHEMTREC)
 CAGE:B0589

=== Contractor Identification ===

Company Name:E I DU PONT DE NEMOURS & CO
 Address:RAKETSTRAAT, 100, RUE DE LA FUSEE
 City:BRUSSEL
 Country:BE
 Phone:32-(0)15-401.505
 CAGE:B0589
 Company Name:E.I. DUPONT DE NEMOURS & CO
 Address:1007 MARKET STREET
 Box:City:WILMINGTON
 State:DE
 ZIP:19898
 Country:US
 Phone:800-441-7515;800-441-9442
 CAGE:18873

===== Composition/Information on Ingredients =====

Ingred Name:ZINC (SARA III)
 CAS:7440-66-6
 RTECS #:ZG8600000
 OSHA PEL:10 MG/M3
 ACGIH TLV:10 MG/M3
 EPA Rpt Qty:1000 LBS
 DOT Rpt Qty:1000 LBS

===== Hazards Identification =====

LD50 LC50 Mixture:LD50 (MICE)=15 MG/KG (INTERPERITONEAL)
 Routes of Entry: Inhalation:NO Skin:NO Ingestion:YES
 Reports of Carcinogenicity:NTP:NO IARC:NO OSHA:NO
 Health Hazards Acute and Chronic:TOXIC IF INGESTED.
 Explanation of Carcinogenicity:NOT RELEVANT
 Effects of Overexposure:SEE HEALTH HAZARDS.
 Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

===== First Aid Measures =====

First Aid:INGEST: CALL MD IMMEDIATELY . INHAL: REMOVE TO FRESH AIR.
 SUPPORT BREATHING (GIVE OXYGEN/ARTIFICIAL RESPIRATION) . EYES:

IMMEDIATELY FLUSH W/POTABLE WATER FOR A MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD . SKIN: FLUSHW/COPIOUS AMOUNTS OF WATER. CALL MD .

=====
Fire Fighting Measures
=====

Extinguishing Media: DRY CHEMICAL.
Fire Fighting Procedures: USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT . NO SPECIAL PROCEDURES.
Unusual Fire/Explosion Hazard: EXPLOSIVE IF HIGH LEVELS OF DUST EXPOSED TO FIRE.

=====
Accidental Release Measures
=====

Spill Release Procedures: NO SPECIAL PROCEDURES.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

=====
Handling and Storage
=====

Handling and Storage Precautions: NO SPECIAL PROCEDURES.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

=====
Exposure Controls/Personal Protection
=====

Respiratory Protection: NONE. USE NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation: LOCAL EXHAUST.
Protective Gloves: IMPERVIOUS GLOVES .
Eye Protection: ANSI APPROVED SAFETY GLASSES .
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

=====
Physical/Chemical Properties
=====

Boiling Pt: B.P. Text: 1665F, 907C
Melt/Freeze Pt: M.P/F.P Text: 788F, 420C
Vapor Pres: 1 @ 487C
Spec Gravity: 7.13
Evaporation Rate & Reference: 0
Solubility in Water: INSOLUBLE
Appearance and Odor: BLUISH-WHITE METAL.
Percent Volatiles by Volume: 0

=====
Stability and Reactivity Data
=====

Stability Indicator/Materials to Avoid: YES
NONE.
Stability Condition to Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products: NONE.

=====
Disposal Considerations
=====

Waste Disposal Methods: SEPARATE FROM ACIDIC SOLUTIONS. DISPOSE OF BY MEANS AS TO COMPLY WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS OR CONTACT AN APPROVED AND LICENSED DISPOSAL AGENCY.

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department

of Defense. The United States of America in no manner whatsoever, expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.