Heartland Environmental Associates, Inc.

HEALTH AND SAFETY PLAN

Sample Street Business Complex
3702 West Sample Street
South Bend, Indiana 46619
Saint Joseph County

VRP ID # 6120801

Table of Contents

List of Attachments

1.0 GENERAL INFORMATION

1.1 Project Name

Sample Street Business Complex

1.2 Project Number

Heartland Project ID Number: 5009-08-01

1.3 Location

3702 West Sample Street, South Bend, Indiana

1.4 Client

All work provided under the planned scope of work will be completed for:

Urban Enterprise Association of South Bend, Inc.
227 West Jefferson Boulevard, South Bend, IN 46601
attn: Ms. Pamela Meyer

1.5 Plan Prepared By

Nivas R. Vijay, CHMM – Senior Project Manager - Heartland Environmental Associates, Inc.

1.6 Plan Approved By

John R. Barnhart, LPG – Senior Project Manager - Heartland Environmental Associates, Inc.

2.0 SITE DESCRIPTION

2.1 General Site Description

The Urban Enterprise Association of South Bend, Inc. (UEA) currently owns and operates the Sample Street Business Complex located at 3702 West Sample Street, South Bend, St. Joseph County, Indiana.

The project site was originally developed as the Torrington Company Heaving Bearing Facility in 1928 and utilized for the manufacture of metal bearings. The facility expanded several times, last expanding in 1967. The site historically operated an approximately 333,000 square foot manufacturing facility on 15 acres of property. The site operated two underground storage tank (UST) areas and five storm water and cooling water ponds located at the south end of the property. The site ceased manufacturing operations in September 1983 and began site closure activities in preparation for sale of the property.

Site closure activities included an environmental assessment of the facility. From 1984 through 1991 numerous subsurface soil and groundwater investigations were conducted at the site around the former UST area and in the vicinity of the storm water and cooling water ponds.

These investigations found elevated concentrations of VOCs in pond sediments and pond water samples. Elevated concentrations of VOCs and mineral spirits (light hydrocarbon chemicals) were also found in soil and groundwater borings throughout the site, particularly near the loading dock area located in the southwest portion of the site.

In July 1986, five petroleum and solvent USTs were removed from the site. Confirmation samples showed that high levels of VOCs remained in the soils. Four of the five pond areas were also excavated and approximately 1,700 cubic yards of impacted pond sediments were removed from the site.

Further investigations conducted from 1990 through 1991 found additional groundwater impacts Chemical impacts were also encountered in monitoring wells installed down-gradient from the site source areas. Groundwater sampling also showed the presence of free product light non-aqueaous phase liquid petroleum (LNAPL) near the loading dock area.

High concentrations of metals were found in fill materials at the site. The highest concentration of impacts was in the southwest portion of the site and associated with the cooling water pond identified as Pond 4. Visual chemical impacts were noted down to 5 feet in the area of the pond. Concentrations of cyanide were encountered in these sediments, however no PCBs were present.

In 1992, 960 cubic yards of material were excavated and removed from around Pond 4. Soil sampling results showed that VOC impacts to soil remained at depth.

From 1992 through 1994, pilot testing was performed and a soil vapor extraction (SVE) and air sparging (AS) remediation system was designed to remediate the free product petroleum and VOC impacts to both soil and groundwater. The design called for the construction of two separate remediation systems. The first system was to be installed in the loading dock area and the second system was to be installed in the eastern portion of the site building.

The system was installed in late 1995/ early 1996 and began full time operation midyear 1996. At the time, the Corrective Action Work Plan referred to IDEM Tier II Cleanup Goals as the standard to monitor the effectiveness of the remediation system. No formal consultation with IDEM was conducted as part of the site investigation or remedial design. The annual system effectiveness report for the year 1998 indicated that the system was running efficiently with a 90% run time; however free product petroleum was still present in groundwater monitoring wells at the loading dock and both TCE and PCE were still encountered at elevated concentrations throughout the site. No additional documentation was available after this date regarding the remediation system or pertaining to any system closure.

Based on the lack of documentation, Heartland recommended that the UEA conduct a Limited Phase II ESA in the formerly identified source areas to evaluate for the presence or absence of residual chemical impacts present in the soil and groundwater.

The Limited Phase II EAS was performed in 2011. Ten soil borings were advanced in the southwest loading dock area, in the southern portion of the site, and in the southeastern and eastern portions of the site. Heartland also collected groundwater samples from 10 of the existing groundwater monitoring wells located in the central and southern portion of the site.

Impacts of metals and TPH-ERO were found in some soil samples. No VOC impacts were found in soils. A VOC imapact was found in a groundwater sample from one soil boring. No other soil boring or monitoring well exhibited any VOC impacts to groundwater.

In 2012, the UEA applied for enrollment of the property in the Indiana Voluntary Remediation Program (VRP). In 2012, the facility was formally accepted into the VRP. Consequently, Heartland has prepared a Remediation Work Plan (RWP) for the site. The objective of the RWP is to determine the current status of soil and groundwater contamination at the site and to determine what actions, if any, are needed to conform with the Indiana Remediation Program.

3.0 PROJECT OBJECTIVES(S)

3.1 Description of Planned Work Area Activities

The scope of work for this project involves confirmatory sampling and quarterly collection of groundwater monitoring samples.

4.0 PROJECT ORGANIZATION

Table 1. Project Organization

Team Member	Responsibility
Nivas Vijay	Project Manager/Site Supervisor/Primary Point of Contact
John R. Barnhart, LPG	Health and Safety Officer
David Nye	Senior Technician/Site Personnel
John A. Sill	Site Personnel
All personnel allowed on site will have current Health & Safety Training as required by 29 CFR 1910.120.	

4.1 Responsibilities

4.1.1 Senior Project Manager/Site Supervisor

The Project Manager will be responsible for preparation of the site work plan and provide adequate personnel, time, and resources to conduct on-site activities. The Project Manager will also be responsible for the project schedule and on-time completion of the project. The Project Manager is also responsible for overall site safety.

The Site Supervisor will be responsible for field team operations and safety. The Site Supervisor will manage daily site operations. The Site Supervisor will conduct daily on-site safety briefings and make sure proper safety procedures and policies are being conducted.

4.1.2 Health and Safety Officer

The Health and Safety Officer (HSO) will advise the Project Manager of all on-site health and safety issues. The HSO will develop or assist in development of this site-specific health and safety plan and is responsible for making sure that the procedures outlined in this plan are properly implemented. The safety officer shall be notified of any emergencies. The safety officer will be available to evaluate changes in site conditions or site operations that may potentially warrant changes in the site safety plan.

4.1.3 Site Personnel

Site personnel will be required to follow safety policies and procedures outlined and set forth in this document. Each individual conducting operations at the site will be required to read and sign the safety plan.

4.1.4 Subcontractors

Subcontractors involved with site operations will be required to have current 24 or 40-hour training under 29 CFR 1910.120. Heartland will inform subcontractors of potential site hazards and each subcontractor will be required to develop their own site-specific plan. Each subcontractor will be required to maintain a high level of safety while conducting operations.

Notes

- Any violations of the safety plan may result in disciplinary action against the individual.
- The safety plan may be changed at any time by the project manager due to changes in scope of work or site conditions. The project manager will be immediately notified of the changes.
- All on-site staff will review the safety plan with the senior project manager/project manager before entry onto the site.

5.0 HAZARD ANALYSIS

The chemical and physical hazards that may be present are discussed in the following subsections.

5.1 Chemical Hazards

The primary impacts encountered at the site are related to historic manufacturing operations at the site. Chemicals used or detected at the site (including potential degradation products) include heating oil, tetrachloroethylene, trichloroethylene, cis 1,2-dichloroethylene, trans 1,2-dichloroethylene, vinyl chloride, 1,1,1-tricholorethane, and lead. The chemical-specific Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) and chemical and physical properties are shown in the following table.

Table 2. Chemical Hazards

Principal Contaminant(s)	PEL ppm	IDLH ppm	Incompatibilities & Reactivities	Symptoms/Effects of ACWE Exposure
heating oil	none	none	Strong oxidizers	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)
tetrachloroethylene	100	150	Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
trichloroethylene	100	1000	Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]
cis & trans 1,2-dichloroethylene	200	1000	Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization.]	Irritation eyes, respiratory system; central nervous system depression
vinyl chloride	1	ND	Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.]	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]

Table 2. Chemical Hazards

Principal Contaminant(s)	PEL ppm	IDLH ppm	Incompatibilities & Reactivities	Symptoms/Effects of ACWE Exposure
1,1,1-tricholorethane	350	700	Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water [Note: Reacts slowly with water to form hydrochloric acid.]	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage
lead	0.050	100	Strong oxidizers, hydrogen peroxide, acids	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

ND: No Data Available
No PEL: No OSHA established PEL
TLV: Threshold Limit Value American Conference of Governmental Industrial Hygienists (ACGIH)

5.1.1 Waste Type(s)

- Free Product – No
- Liquid – Yes, purge water
- Solid – Yes, soil cuttings from borings, if necessary
- Sludge – No
- Gas – Possible, volatile organic vapors from constituents in table above

5.1.2 Waste Characteristics

- **Corrosive** – No.
- **Flammable –** Unlikely; flammable components not likely to be encountered.
- **Reactive** – No.
- **Oxidizer** – No.
- **Toxic –** Slightly. Materials that may be present can be toxic in large quantities or high concentrations for what is expected during this phase of work. If levels of these chemicals reach the OSHA PELs, STELs, or IDLH, they could potentially be acutely toxic. This type of symptom would occur if a person inhaled a very large dose of these chemicals or ingested a large dose. Chronic or long-term exposure is most likely to occur in the human body when an exposure occurs in lower levels over an extended period of time. This may cause damage

to internal organs weeks or years after the exposure. Exposure levels for constituents listed in the table above are anticipated to be well below the OSHA PEL-Time Weighted Average (TWA). Because the materials are in a soil or water mix, the toxicity level of the material is anticipated to be very low.

5.1.3 Suspected Route of Exposure

- Ingestion – moderate risk. Impacted soil particles from soil cuttings, but likely from improper sanitation after handling impacted soil or groundwater
- Inhalation – low risk. Vapors from impacted soil or groundwater
- Skin Absorption – low risk. Contact with impacted soil or groundwater.

Potential risk of direct contact or splash, but unlikely with proper personal protective equipment (PPE). Employees must wear gloves when sampling soils or water.

5.1.4 Material Safety Data Sheets (MSDS)

The MSDS for each chemical listed in Table 2 is provided in Attachment A. Please refer to the MSDS for proper first aid and other relevant hazard information.

5.2 Physical Hazards

Physical hazards of major concern are trip hazards, heat and cold stress, equipment operations, system operations, and utilities. Each of these issues has been addressed in the following sections.

5.2.1 Heat Stress

Since operations will be conducted year-round, heat stress is a concern during the summer months. The wearing of personal protective equipment puts a worker at considerable risks for heat stress. Results from over exposure to heat may include the following signs and symptoms.

Heat Rash results when moisture is held close to the skin when the body sweats, which prevents evaporation and clogs pores. Signs and symptoms include:

- Red rashes and
- Blotchy skin

Heat Cramps are caused by prolonged exposure to heat and sweating without adequate fluid and electrolyte replacement. Signs and symptoms include:

- Muscle spasms in the abdomen and muscles most heavily used, and
- Pain in the hands, feet, and abdomen.

Heat Exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale skin
- Heavy sweating
- Dizziness, fainting, blurred vision, and
- Low blood pressure and a rapid pulse

Heat Stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained immediately. Signs and symptoms include:

- Hot and unusually dry skin, red face
- Lack of or reduced perspiration
- Dizziness and confusion and
- Strong rapid pulse, and coma

To reduce the risk of heat exposure workers will drink 16 ounces of non-caffeinated fluid (preferably water or diluted drinks) before beginning work. Workers are urged to drink plenty of fluids throughout the work shift, as needed. A total of 1.6 gallons is recommended, but more may be necessary to maintain hydration. On-site medical monitoring will occur when ambient temperatures indicate the likelihood for heat stress to occur (i.e. Level A or B work).

Operations conducted wearing impermeable ensembles will follow the work/break schedule.

Table 3. Level A/B Temperature Related Work Schedule

Adjusted Temperature	Break Schedule
90 F or above	After 15 minutes of work
87.5 – 90 F	After 30 minutes of work
82.5-87.5 F	After 60 minutes of work
77.5-82.5 F	After 90 minutes of work
72.5-77.5 F	After 120 minutes of work

5.2.2 Cold Stress

Exposure to cold temperatures increases the likelihood and potential for worker disorders or conditions that could result in injury or illness. Strong wind accompanied by cold temperatures can exacerbate the occurrence of injury or illness. The two generally recognized cold disorders or conditions are frostbite and hypothermia. Contributing factors to these disorders or conditions are:

- Exposure to extremely cold air temperatures
- High winds (wind chill or equivalent chill temperature (ECT))
- Contact with liquids (groundwater)
- Inadequate clothing
- Poor worker health

Control measures to prevent cold stress include dressing in warm, layered clothing (insulated or water-impermeable clothing is best) and warming up as necessary by taking shelter or breaks. An outer shell of windproof material is essential to preventing cold stress in high wind conditions when the air temperature is below 39.2° F. Make sure to protect extremities, especially ears and hands. Skin should be kept dry to avoid additional opportunities for frostbite. Replace wet clothing immediately with warm dry clothing as needed.

5.2.3 Excessive Noise

Hearing protection must be utilized during noisy operations (i.e. when performing soil probing or well installation activities) to conserve hearing. The drilling and sampling activities that will occur for this project should not require implementation of a hearing conservation program. If site operations indicate noise level TWAs above the OSHA Action Level of 85 dBA, then applicable regulations (29 CFR 1910.95, 29 CFR 1926.52 and 29 CFR 1926.101) will be followed for site operations with respect to hearing conservation.

5.2.4 Confined Space Entry

Not applicable for this project. Only Heartland personnel trained to enter areas determined to be a permit-required confined space should do so, if necessary.

5.2.5 Open Excavations

Only Heartland personnel trained to enter areas deemed areas of open excavation should do so.

5.2.6 Welding and/or Cutting

Welding is not expected for this project.

Heartland recommends that cold cutting or other similar method be utilized in lieu of hot welding/cutting operations whenever possible. Welding operations should be performed in accordance with the general requirements of 29 CFR 1910 Subpart Q and any specific requirements

of that subpart that apply (i.e. oxygen fuel gas welding on tanks and cylinders). The basic general requirements must address fire prevention and protection during welding operations (including providing fire extinguishers and training for personnel who may use them), personal protection of welders and associated personnel, and ventilation in the welding areas. Air monitoring for lower explosive limits (LELs) shall be performed before and during welding operations. If air monitoring data indicates that a LEL exists, all welding/cutting operations should be halted immediately until the hazard is eliminated.

5.2.7 Flammable Liquids

Impacted media are noncombustible in nature; however caution should be utilized when working with or near highly impacted medias, if found to be present on site. Flammable liquids used on site shall be handled, stored, and marked properly. Flammable liquid containers will be OSHA-approved Safety Containers. Storage of flammable materials is not expected for this phase of work, but if containers will be stored at the site, they should be stored in a flammable storage cabinet or other appropriate secured location outside the exclusion zone.

5.3 Equipment Operation/Tools

Should the necessity of subsurface soil borings be required, Heartland will utilize a GeoProbe® rig to conduct all site activities. Regular hand held tools will be used for all remaining aspects of the project.

5.3.1 Equipment

Each piece of equipment in operation at the site will be inspected before use at the site. This will be the responsibility of the subcontractor. The equipment will be inspected to make sure that all safety devices are clearly labeled and functioning properly. This will include safety lights, emergency shut-off devices, and audio warning devices. Inspections of equipment will also be completed daily. The inspections will attempt to identify any worn parts and/or damaged safety equipment. If a safety issue is discovered, the piece of equipment will be tagged, and placed out of commission. The equipment will either be replaced or repaired. Daily inspection sheets will remain in the custody of the excavator. Each piece of heavy equipment will have a working fire extinguisher and first aid kit.

5.3.2 Operators

Operators will be properly trained on each piece of equipment that they operate. This will be the responsibility of the subcontractor. Operators will have demonstrated competency in the operation of the equipment. Operators will inform other on-site staff of emergency shut-off switches and other safety devices that may be used during emergency situations.

5.3.3 Site Personnel

Employees will not be allowed on or in the proximity of equipment until they have been properly trained and have received a safety briefing. The site supervisor or site personnel will keep a record of this briefing. Staff shall stay out of the operating range of any heavy equipment onsite. Entry into the operating zone is allowed only after the operator's attention has been gained and all buckets or extensions have been grounded.

5.3.4 Slip, Trip, Fall Hazards

The site should be cleared of slip, trip, and fall hazards. Tools and equipment will be stored appropriately, so as not to cause a slip or trip hazard, after decontamination. Any liquids will be contained immediately; areas with permanent walking hazards will be identified with marking paint or caution tape. The site supervisors will complete an assessment of general housekeeping at the site.

5.3.5 Presence of Underground Utilities

In order to eliminate hazards from underground utilities such as electric lines and natural gas supply lines, an underground utility marking service will be notified 48 hours in advance of any excavation activities. The typical color markings used are shown below:

- **Electric:** Marked by red paint.
- **Gas**: Marked by yellow paint,
- **Water**: Marked by blue paint.
- **Sewer**: Marked by green paint.
- **Telephone**: Marked by orange paint.
- **Specify exact location**: Blocks of residential lots.
- **Precautions to be taken**: Indiana811 will be contacted to mark all lines.

In the event that private utilities exist on site, a private utility locating service will be utilized to mark utilities.

5.3.6 Presence of Overhead Utilities

Special precautions must be taken when using a drill rig or excavator onsite within the vicinity of electrical power lines and other utilities. Contact with live power lines may lead to shock, burns, and even electrocution. In addition, fires can potentially be started when power lines are contacted or downed.

Overhead utilities will be located, noted, and emphasized in project work plans. Each overhead line must be considered dangerous and noted before mobilization of the drill rig. An inspection of the site prior to site operations will be conducted to assess overhead lines and their locations. Overhead

lines that are low or sagging must be noted, and the proper utility notified. No sagging or lowered lines are to be touched by site workers.

Areas where excavators are in operation must be inspected before operations occur. The minimum distance from any point or equipment extension to the nearest power lines should be determined when the extension is raised or being raised. The extension should not be raised or equipment operated if the distance is less than 20 feet. This is due to the potential of arcing and the movement of lines in the wind.

5.3.7 Traffic

Traffic hazards are prevalent at this facility. Before leaving for a site, make sure necessary traffic control equipment, cones, caution tape, and warning flags have been loaded into the field vehicle. High-visibility clothing and/or vests must be worn when on-site. Be sure to note traffic concerns, even when wearing vests, and utilizing the following demarcation systems.

- **Installing a well or advancing a soil boring** – Use an appropriate number of cones and flags to demarcate the work zone. Cordon off the cone boundary with caution tape. Set-up the cone system before beginning work and take away upon completion of work tasks.

5.3.8 Weather

Proper care should be taken to understand the daily seasonal weather conditions prior to working onsite. Please refer to the sections on heat and cold stress above. If rain and/or snow are found on the ground at the site, then special caution must be taken with regard to work processes and drilling. Site personnel should exercise caution while walking, carrying equipment, or other items on snow. Prior to any drilling, remove snow in a radius of at least 5 feet from the point to drill to check for utility mark-outs.

5.3.9 Animals/Insects

It is unlikely that animals or insects will present a hazard for this site. However, workers should be wary of any animals or insects present on the site. Survey the areas where work will be performed for signs of insects, such as bee's nests, and use an insect repellant if necessary. If ticks or other attaching insects are prevalent, then site personnel should inspect themselves prior to leaving the site. Be aware of any larger animals that may be present and avoid these animals.

6.0 SITE CONTROL

6.1 Site Access

During the course of site activities, no personnel other than Heartland staff or subcontractors who are 40-hr or 24-hr OSHA trained will be allowed onto the site to perform the activities outlined in the Scope of Work for this project. Otherwise, site control will be maintained by on-site personnel. A sign in sheet or this health and safety plan will be utilized to keep records of the workers entering

and exiting the site. Heartland will place safety cones and caution tape, if necessary, around areas where any drilling and sampling activities are being conducted. All site personnel must check-in with on-site personnel or the Project Manager prior to the start of any onsite work.

Work will be conducted at various locations at the site. Area-specific exclusion zones should be set-up by the contractor performing the work at that location. Personnel entering these areas will be required to be in level C, or modified C PPE gear, depending on the air monitoring results.

If an outside agency, comes onto the site, the following procedures should be followed:

- Ask to see the representatives credentials and record pertinent information (name, agency, ID #, etc.) in the field book.
- Request that any persons entering the exclusion zone be outfitted in the proper PPE.

6.1.1 Exclusion Zones

It is not anticipated that exclusion zones will be required to be set up for this project. Should exclusion zones be necessary, exclusion zones will be limited to the areas where the work pertaining to the containment area is being conducted. Personnel entering this area must be in Level D PPE and may be required to be in level C, or modified C PPE, depending on air monitoring results. Employees are not allowed to smoke, eat, drink, or apply cosmetics or sunscreen in the exclusion zone.

6.1.2 Contamination Reduction Zone

This area is located outside of the exclusion zone. No impacted personnel, PPE, or heavy equipment will be allowed leave the exclusion zone without being properly decontaminated. Specific decontamination procedures are outlined in Section 9.0 of this plan.

6.1.3 Support Zone

The support zone will be considered the remaining area of the facility not included in the exclusion zone or the contamination reduction zone. This area will not contain any contaminated material or personnel. Personnel in this area will be required to have level D PPE.

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Based on the evaluation of potential hazards, the following levels of personal protection have been designated for site activities. Each contractor must make a hazard assessment in determining the proper PPE required for the activities they will perform. The assessment should include air monitoring and possibly analytical data in order to make the proper PPE determination. Determination of the proper PPE includes decisions on the type of respirator, protective clothing (chemical resistant suits and gloves), and other protective gear, such as hard hats. Site personnel must have successfully passed a qualitative fit test in a respirator present for site use, if needed. Additionally, site personnel must be trained in the use of the equipment utilized on site.

7.1 Level A

Not applicable

7.2 Level B

Not applicable

7.3 Level C

If site air monitoring or sampling results reveal elevated levels warranting respiratory protection, site personal will use level C protection that includes the following:

- Poly-coated Tyvek suit
- Inner glove
- Nitrile outer glove
- Inner boot
- Hard hat
- Outer boot
- Full-face respirator

Modified C PPE will be used when no inhalation hazards exist, but where there is a small potential for contact with contamination. Modified C PPE includes the following items:

- Poly-coated Tyvek
- Inner glove
- Nitrile outer glove
- Inner boot
- Outer boot
- Hearing protection
- Hard hat
- Safety glasses

7.4 Level D

Level D equipment will include the following equipment:

- Hard hat
- Safety glasses

- Steel-toed shoes
- Long sleeve shirt with traffic safety vest

Level C PPE will be required only if air monitoring data suggests the upgrade in PPE. PPE may be down graded to modified level C, if daily air-monitoring operations have been conducted and results indicate that respiratory protection is not necessary.

Onsite personnel conducting remedial system operation and maintenance activities will be required to wear level D PPE when at the site.

8.0 MEDICAL SURVEILLANCE

To safeguard the health of field personnel, a medical monitoring program will be implemented. Those Heartland employees and any contractors performing hazardous waste work on-site should be included in the Medical Surveillance Program as highlighted below:

- Any employees who are exposed to hazardous substances above the published exposure limits, without the use of a respirator, for thirty days or more per year.
- Any employee who wears a respirator for 30 days or more per year.
- Any employee who develop symptoms due to overexposure to hazardous substances, become ill, or who are injured due to overexposure to hazardous substances.
- Member of HAZMAT teams.

If Heartland employees and contractors fall into any of the above categories, a baseline medical examination should include the following, based on job task:

- Medical and work history
- Physical examination performed by a local licensed physician
- Eye exam
- pulmonary function test
- X-ray (chest)
- EKG
- Audiogram
- Urinalysis
- Blood chemistry
- Heavy metals
- Other tests as deemed necessary

All employees working on-site will provide proof of a baseline examination. Periodic medical monitoring every 12 or, at a minimum, every 24 months is required. Personnel medical records will be maintained according to 29 CFR 1910.120(f) (8). Access to the records will be consistent with 29 CFR 1910.20. Any unexpected exposures will be reported to the safety officer.

9.0 DECONTAMINATION

All decontamination procedures will follow Heartland's SOPs. All equipment, machinery, trucks, and personnel shall be properly decontaminated prior to exiting the area. Decontamination of equipment will include washing with Alconox soap water and a de-ionized water rinse.

9.1 Personnel Decontamination Procedures

All personnel entering the exclusion zone will undergo decontamination prior to leaving the site. Personnel will proceed through the following Level C decontamination stations:

Station 1

- Thorough wash of all equipment (hand tools, monitoring equipment, etc.)
- Disposal of gloves and disposable coveralls
- Equipment Required: Disposal containers, liquid collection facilities

Station 2

- Thorough wash of boots, respirator, and other equipment that is not disposable
- Equipment Required: Alconox and water

Station 3

- Storage facilities for decontaminated PPE and tools.
- Equipment Required: storage shelves

9.2 Heavy Equipment Decontamination

Inspection of heavy equipment and vehicles for gross contamination will be conducted prior to leaving the exclusion zone. The equipment will then be placed into a decontamination pad in the contamination reduction zone. A power washer and brushes will be used to remove contaminated material; residual material will be collected and containerized for proper disposal.

9.3 Decontamination Waste Water

- **Collection**: Collect all wastewater on-site in a labeled 55-gallon drum pending analysis.
- **Disposal**: Solid and liquid material will be evaluated and sent for proper waste disposal offsite.

10.0 AIR MONITORING

Air monitoring will be conducted by site personnel trained in the use and calibration of the equipment utilized at the site. Calibration of air monitoring equipment should be conducted in the field and recorded in the logbook. Monitoring should be conducted at a minimum as follows: 1) prior to initiating work, 2) when work conditions change, or 3) when conditions dictate that continuous monitoring is necessary.

10.1 Personal Air Monitoring

In accordance with 29 CFR 1910.120, each contractor and subcontractor, as applicable and according to their respective SOPs, will conduct personal air monitoring for their employees. Personal sampling should be performed for those workers in worst-case or high-risk situations. Documentation of sampling and results must be made available, if requested.

10.2 Perimeter/Area Monitoring

Photo-ionization detectors (PIDs) will be used to monitor for elevated levels of contaminants and determine if upgrades in the level of PPE will be necessary. Air monitoring may also be conducted for LELs and oxygen levels in the atmosphere near the drilling operation using a combustible gas indicator (CGI). If an LEL is detected, operations will be stopped to determine the reason for the reading occurring and if and how the hazardous condition will be eliminated. If oxygen levels are detected below 19.5% or above 23.5%, work will also be stopped to determine the reason for those readings.

Calibration of all equipment will be conducted in accordance with manufacturer's specifications. All documentation of calibration of equipment and sampling results must be available from each contractor and subcontractor upon request.

11.0 CONTINGENCY PLAN

11.1 Emergency Communication Signal(s)

Emergency communication between Heartland personnel will be direct, if possible. If visual contact cannot be maintained, hand-held radios will be used when and if necessary. Hand signals should be used when necessary as follows:

Signal	Message
Hand gripping throat	Can't breathe
Grip partners wrist(s)	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	I'm OK/I understand
Thumbs down	No/negative

11.2 Emergency Escape Route(s)

In case of an emergency, all site personnel will be directed to the west side of the site. If it is found that airborne hazards are being carried to this location, then an alternate location should be selected based on weather conditions (i.e. wind direction).

11.3 Emergency Equipment on Site

Each contractor and subcontractor should supply the proper emergency equipment necessary based on the respective job tasks at the site. The Heartland H&SO will be responsible for making sure contractors and subcontractors have the necessary minimum emergency equipment and coordinate the use, if necessary, of these items between subcontractors.

- First Aid Kit: Yes, in field vehicles
- Fire Extinguisher: Yes, in field vehicles
- Telephone: Mobile phone with on site personnel
- Eye Wash/Safety Shower: Eyewash in field vehicles

11.4 Hazards on Site

The on-site safety hazards include the previously mentioned chemical hazards and physical hazards.

11.5 Re-entry to the Exclusion Zone

Re-entry to the Exclusion Zone following an on-site emergency shall not be permitted until the following conditions are satisfied:

- The conditions resulting in an emergency have been corrected.
- Appropriate personnel have received medical attention, if applicable.
- The hazards have been re-evaluated.
- The Site Safety Plan has been reviewed and determined adequate for the hazards encountered.
- All site personnel have been instructed in any new hazards and changes to the Site Safety Plan.

12.0 EMERGENCY RESPONSE PLAN

12.1 Pre-Emergency Planning

All personnel shall read the Health & Safety Plan (HASP) and sign the signature page. Emergency procedures outlined in this plan should be discussed with on site personnel and followed when appropriate. Should an emergency occur, a safety meeting must be held and documented and

relevant personnel outlined in this plan contacted. Site personnel should follow the chain-of-command outlined in this plan with the senior Heartland personnel relinquishing authority to the LEPC when on site. All small, non-life threatening operations will be controlled by site personnel. This will include small releases less than reportable quantities, small equipment fires, or non-emergency first aid issues.

In the case of large emergencies or life-threatening situations, efforts will be focused on the removal of site workers from the hazardous situation. Emergency contact will be made immediately, including all necessary state, local, Federal, and Heartland personnel.

12.2 Lines of Authority

Heartland's Project Manager.....574-289-1191

Heartland's Health & Safety Officer.....574-289-1191

Heartland's Phone No.: 574-289-1191

12.3 Hazard Analysis

Refer to Section 5.0 of this Health & Safety Plan

12.4 Safe Distances & Refuge

In the event of an evacuation, personnel will meet at a pre-determined designated location upwind of the site. Information will be gathered and relayed to the first emergency responder at the scene. The location of the meeting place will be determined by the on-site supervisor, because operations may be performed at multiple areas at the site.

12.5 Air Monitoring

In the event of emergency, Heartland will use real time air monitoring to determine a safe distance.

12.6 Refuge

Refuge may be sought in a location pre-determined by the site supervisor. If this area is not considered safe, then the company support vehicles will be used to transport site personnel to a safe distance. The support vehicle should be placed at safe distance from site activity and upwind, if possible.

12.7 Site Control & Security

Heartland will assist emergency responders in maintaining site security.

12.8 Evacuation Procedures

Staff will be instructed to move to a safe location or meeting point to make emergency calls and further evaluate the emergency.

12.9 Emergency Decontamination

Emergency decontamination will consist of removal of protective suit, disposable gloves, and boot covers by workers adequately protected in an environment where the victim will not be re-contaminated.

12.10 Emergencies

Emergencies will be made known to the property owners through the line authority. An evaluation of the situation will dictate whether additional emergency equipment/personnel are necessary to mitigate the problem. Medical treatment for minor problems may be obtained from on site first aid kits. Major medical problems may be addressed at:

Memorial Hospital -South Bend
615 N Mich igan St
Sou th Ben d, IN 46601
(574) 647-1000

Hospital directions and emergency phone numbers are found in Attachment C. When notifying any authority or responder of a chemical emergency, also inform them of the chemical hazards involved.

13.0 EMERGENCY RESPONSE

See Attachment A for MSDS sheets. Attachment B includes a general map of the site with relocation areas. Attachment C includes emergency phone numbers and a map with directions to the nearest hospital.

14.0 SIGNATURE PAGE

All personnel have read the above plan and are familiar with its provisions. All personnel have received medical surveillance and training in compliance with the health and & safety policies outlined in this plan, including all applicable Federal, state and local regulations. Heartland personnel may stop work at the site if it is not performed in accordance with this plan or OSHA regulations. In addition, subcontractors shall provide and make available a site safety plan at least as stringent as this plan. Heartland reserves the right to review any subcontractors plan and determine its authority.

All on-site personnel, subcontractor personnel, and any visitors within the confines of the work area are required to sign the following agreement prior to conducting work at the site.

1. I have read and fully understand this Site Health and Safety Plan.
2. I agree to abide by the provisions and my responsibilities outlined in this Site Health and Safety Plan.

Name (Company)	Signature

Heartland Environmental Associates, Inc.

ATTACHMENT A
Material Safety Data Sheets (MSDS)

MATERIAL SAFETY DATA SHEET

No. 2 Heating Oil

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: No. 2 Heating Oil**Product Code:** Multiple

Synonyms:
1258
High Sulfur No. 2 Heating Oil
High Sulfur No. 2 Heating Oil - Dyed
High Sulfur No. 2 Heating Oil Blend Stock
Home Heating Oil
Low Sulfur No. 2 Heating Oil
No. 2 Fuel Oil
Winterized No. 2 Low Sulfur Heating Oil

Intended Use: Fuel Chemical Family: Petroleum hydrocarbon

Responsible Party:
Petroleum Products Corp.
900 South Eisenhower Blvd.
Middletown, PA 17057

For Additional MSDSs 717-939-0466

Technical Information: 918-661-8327

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident
Call PERS
North America: 1-800-633-8253

Health Hazards/Precautionary Measures: Causes severe skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Flammable liquid and vapor. Keep away from heat, sparks, flames,static electricity or other sources of ignition.

Appearance: Straw-colored to dyed red**Physical form:** Liquid

Odor: Characteristic petroleum

NFPA Hazard Class: **HMIS Hazard Class**

Health: 1 (Slight) Health: 3*(High)Flammability:2 (Moderate) Flammability: 2 (Moderate)Reactivity: 0 (Least) Physical Hazard: 0 (Least)

*Indicates possible chronic health effects.

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% VOLUME	EXPOSURE GUIDELINE Limits	Agency	Type
Diesel Fuel No. 2 CAS# 68476-34-6	100	100 mg/m3	ACGIH	TWA-SKIN
NaphthaleneCAS# 91-20-3	<1	10 ppm 15 ppm 10 ppm 250 ppm	ACGIH ACGIH OSHA NIOSH	 TWASTEL TWA IDLH

Note: State, local or other agencies or advisory groups may have established more stringent limits.Consult an industrial hygienist or similar professional, or your local agencies, for further information.

1%=10,000 PPM.

All components are listed on the TSCA inventory.

3. HAZARDS IDENTIFICATION

Potential Health Effects:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Severe skin irritant. Contact may cause redness, itching, burning, and severe skin damage.Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin, leadingto dermatitis (inflammation). Not acutely toxic by skin absorption, but prolonged or repeated skincontact may be harmful (see Section 11).

Inhalation (Breathing): No information available. Studies by other exposure routes suggesta low degree of toxicity by inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion. ASPIRATION HAZARD - This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat,irritation of the digestive tract, nausea, diarrhea and transient excitation followed by signs of nervoussystem depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation andfatigue).

Cancer: Possible skin cancer hazard (see Sections 11 and 15).

Target Organs: There is limited evidence from animal studies that overexposure may cause injuryto the kidney (see Section 11).

Developmental: Inadequate data available for this material.

Other Comments: This material may contain polynuclear aromatic hydrocarbons (PNAs) whichhave been known to produce a phototototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure isdiscontinued. Continued exposure to sunlight can result in more serious skin problems includingpigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skindisorders and kidney disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyeswith clean water. If symptoms persist, seek medical attention.

Skin: Immediately remove contaminated shoes, clothing, and constrictive jewelry and flush affectedarea(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seekimmediate medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly bywashing with mild soap and water. If irritation or redness develops, seek immediate medicalattention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and intofresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediatelybegin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualifiedpersonnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because thismaterial can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious andvomiting, place on the left side with the head down. If possible, do not leave victim unattended and observeclosely for adequacy of breathing. Seek medical attention.

Note To Physicians: High-pressure hydrocarbon injection injuries may produce substantialnecrosis of underlying tissue despite an innocuous appearing external wound. Often these injuriesrequire extensive emergency surgical debridement and all injuries should be evaluated by aspecialist in order to assess the extent of injury.

5. FIRE FIGHTING MEASURES

Flammable Properties: **Flash Point: 125-180°F/52-82°C PMCC, ASTM D-93 OSHA Flammability Class: Combustible liquid LEL%: 0.3 / UEL%: 10.0Autoignition Temperature: 500°F/260°C**

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, orother sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronicdevices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsicallysafe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, orexplode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors areheavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of afire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended tocool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applyingcarbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorableconditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazardarea should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, orwhen explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed tofire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazardarea and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (seeSection 5). Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill isrecommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoiningshorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment whentransferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignitedby static discharge. The use of explosion-proof equipment is recommended and may be required (seeappropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTMD-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrationsexceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition suchas sparks or open flames. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have seriousconsequences even though no symptoms or injury may be apparent. This can happen accidentally when usinghigh pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks intubing of high pressure hydraulic oil equipment.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill,grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode andcause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped tothe supplier or a drum reconditioner. All containers should be disposed of in an environmentally safemanner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSIZ49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilatedareas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area "No Smoking or Open Flame." Store only in approved containers. Keep away from any incompatible material (seeSection 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred.Indoor storage should meet OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations belowthe established exposure limits (see Section 2), additional engineering controls may be required. Where explosivemixtures may be present, electrical systems safe for such locations must be used (see appropriate electricalcodes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge maybe used

under conditions where airborne concentrations are expected to exceed exposurelimits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respiratorselection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) orequivalent operated in a pressure demand or other positive pressure mode if there ispotential for an uncontrolled release, exposure levels are not known, or any othercircumstances where air purifying respirators may not provide adequate protection.

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

Skin: **The use of gloves impervious to the specific material handled is advised to prevent skincontact, possible irritation, and skin damage. Examples of approved materials are nitrile,or Viton® (see glove manufacturer literature for information on permeability). Dependingon conditions of use, apron and/or arm covers may be necessary.**

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, orinjury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: Eye wash and quick-drench shower facilities should beavailable in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.It is recommended that impervious clothing be worn when skin contact is possible.

Suggestions for the use of specific protective materials are based on readily available publisheddata. Users should check with specific manufacturers to confirm the performance of their products.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).Appearance: Straw-colored to dyed redPhysical State: LiquidOdor: Characteristic petroleumpH: Not applicableVapor Pressure (mm Hg): 0.40Vapor Density (air=1): >3Boiling Point/Range: 300-690°F / 366Freezing/Melting Point: No DataSolubility in Water: NegligibleSpecific Gravity: 0.81-0.88 @60°FPercent Volatile: NegligibleEvaporation Rate (nBuAc=1): <1Viscosity: 1.7-4.1 cSt @40°FBulk Density: 7.08 lbs/galFlash Point: 125-180°F / 52-82°C PMCC, ASTM D-93Flammable/Explosive Limits (%): LEL: 0.3 / UEL: 10.0

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidantssuch as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

Hazardous Decomposition Products: The use of hydrocarbon fuels in an area withoutadequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur andnitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. ACGIH has included a TLV of 0.02 mg/m3 TWA for diesel exhaust particulate on its 2002 Notice of Intended Changes. See Section 11 for additional information on hazards of engine exhaust.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Diesel Fuel No. 2 (CAS# 68476-34-6)

Carcinogenicity: Chronic dermal application of certain middle distillate streams contained indiesel fuel No. 2 resulted in an increased incidence of skin tumors in mice. This material has not beenidentified as a carcinogen by NTP, IARC, or OSHA. IARC has classified Diesel exhaust as probablycarcinogenic in humans.

Target Organ(s): Limited evidence of renal impairment has been noted from a few case reportsinvolving excessive exposure to diesel fuel No. 2.

Naphthalene (CAS# 91-20-3)

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicityin male and female rats based on increased incidences of respiratory epithelial adenomas and olfactoryepithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice(alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as acarcinogen by IARC.

Acute Data:
Diesel Fuel No. 2
Dermal LD50>5ml/kg (Rabbit)
LC50=No data available
Oral LD50=9 ml/kg (Rat)

12. ECOLOGICAL INFORMATION

Not evaluated at this time

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to thecharacteristic(s) of ignitability (D001) and benzene (D018). If the spilled or released material impacts soil,water, or other media, characteristic testing of the contaminated materials may be required prior to theirdisposal. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and localregulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Containerrinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliancewith federal, state and local regulations. Larger empty containers, such as drums, should be returned to thedistributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult withstate and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Diesel fuel,3 or Combustible Liquid*,UN1202**,III

Non-Bulk Package Marking: Diesel fuel, UN1202** or None **Non-Bulk Package Label:** Flammable or None **Bulk Package Placard/Marking:** Flammable/1202** **Hazardous Substance/RQ** None **Packaging References** 49 CFR 173.150, 173. 203, 173.241 **Emergency Response Guide:** 128

Note: *This product may be reclassed as a combustible liquid when shipped domestically or by rail or highway.If reclassed as a combustible liquid, this product is not regulated by DOT when shipped in non-bulkpackages.

**NA1993 may be used instead of UN1202 for land transportation.

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health: Yes **Chronic Health:** Yes **Fire Hazard:** Yes **Pressure Hazard:** No **Reactive Hazard:** No

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40

SARA 313 and 40 CFR 372:

CFR 372:

Component	CAS Number	Weight %
Naphthalene	91-20-3	<1

California Proposition 65:

Warning: This material contains the following chemicals which are known to the State of California to cause cancer,birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health& Safety Code Section 25249.5):

Component	Effect
Benzene	Cancer, Developmental and Reproductive ToxicantToluene Developmental Toxicant

Diesel engine exhaust, while not a component of this material, is on the Proposition 65 list of chemicals known to theState of California to cause cancer.

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any. Diesel exhaust is a probable cancerhazard based on tests in laboratory animals. It has been identified as a carcinogen by IARC.

EPA (CERCLA) Reportable Quantity:

--None-

Canada - Domestic Substances List: Listed **WHMIS Class:**

B2-Flammable Liquid D2B-Materials causing other toxic effects - Toxic Material

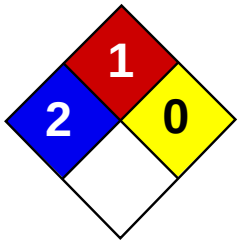
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations
(CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

Issue Date: 02/13/03Previous Issue Date: 01/01/03Product Code: MultipleRevised Sections: 1, 3, 5, 16 Previous Product Code: Multiple
MSDS Number: 724240
Status: Final

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety DataSheet was prepared. **HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.** No responsibility is assumed for any damage or injury resulting from abnormaluse or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the conditionthat the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on thecondition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without alicense.



Material Safety Data Sheet
1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes:

CAS#: 71-55-6

RTECS: KJ2975000

TSCA: TSCA 8(b) inventory: 1,1,1-Trichloroethane

CI#: Not available.

Synonym:

Chemical Formula: CH3CCl3

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
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. 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. The substance is toxic to lungs, the nervous system, liver, 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. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

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. 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: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

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

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of acids, of alkalis.

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. Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

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: 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:

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 gas/fumes/ vapour/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

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. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

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: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995] TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

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

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold 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: 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): 6000 mg/kg [Mouse]. Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

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 more toxic.

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: : 1,1,1-Trichloroethane : UN2831 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: 1,1,1-Trichloroethane Massachusetts RTK: 1,1,1-Trichloroethane TSCA 8(b) inventory: 1,1,1-Trichloroethane SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

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

Other Classifications:

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

DSCL (EEC):
R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 1

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.

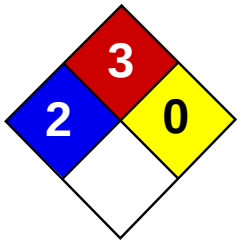
Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:31 PM

Last Updated: 05/21/2013 12:00 PM



Material Safety Data Sheet
1,1-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1-Dichloroethane

Catalog Codes: SLD3280

CAS#: 75-34-3

RTECS: KI0175000

TSCA: TSCA 8(b) inventory: 1,1-Dichloroethane

CI#: Not available.

Synonym:

Chemical Name: 1,1-Dichloroethane

Chemical Formula: C2-H4-Cl2

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
{1,1-}Dichloroethane	75-34-3	100

Toxicological Data on Ingredients: 1,1-Dichloroethane: ORAL (LD50): Acute: 725 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: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, 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. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

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

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: Flammable.

Auto-Ignition Temperature: 458°C (856.4°F)

Flash Points: CLOSED CUP: -17°C (1.4°F). OPEN CUP: -6°C (21.2°F).

Flammable Limits: LOWER: 5.6% UPPER: 11.4%

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

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

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:
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. Eliminate all ignition sources. 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/ vapour/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, alkalis.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

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: 100 STEL: 250 (ppm) from ACGIH (TLV) [1999] TWA: 100 (ppm) from OSHA (PEL) Australia: TWA: 200 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Chloroform like odor (Slight.)

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Colorless.

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

Boiling Point: 57.3°C (135.1°F)

Melting Point: -96.9°C (-142.4°F)

Critical Temperature: 261.5°C (502.7°F)

Specific Gravity: 1.175 (Water = 1)

Vapor Pressure: 180 mm of Hg (@ 20°C)

Vapor Density: 3.44 (Air = 1)

Volatility: Not available.

Odor Threshold: 120 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:
Partially dispersed in diethyl ether. See solubility in water, diethyl ether.

Solubility: Partially soluble in diethyl ether.

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, alkalis.

Corrosivity: Corrosive in presence of aluminum.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Will attack some forms of plastic and rubber

Polymerization: No.

Section 11: Toxicological Information

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

Toxicity to Animals: Acute oral toxicity (LD50): 725 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS).

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: 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 product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:
CLASS 3: Combustible liquid with a flash point greater than 37.8C (100F). Marine pollutant

Identification: : 1,1-Dichloroethane : UN2362 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65 (no significant risk level): 1,1-Dichloroethane 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: 1,1-Dichloroethane Rhode Island RTK hazardous substances: 1,1-Dichloroethane Pennsylvania RTK: 1,1-Dichloroethane Florida: 1,1-Dichloroethane Minnesota: 1,1-Dichloroethane Massachusetts RTK: 1,1-Dichloroethane New Jersey: 1,1-Dichloroethane New Jersey spill list: 1,1-Dichloroethane TSCA 8(b) inventory: 1,1-Dichloroethane TSCA 8(a) PAIR: 1,1-Dichloroethane TSCA 8(d) H and S data reporting: 1,1-Dichloroethane: June 1999 TSCA 12(b) one time export: 1,1-Dichloroethane SARA 313 toxic chemical notification and release reporting: 1,1-Dichloroethane: 1% CERCLA: Hazardous substances.: 1,1-Dichloroethane: 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-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes. R52- Harmful to aquatic organisms.

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: 10/09/2005 05:07 PM

Last Updated: 05/21/2013 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

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: VINYLIDENE CHLORIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 239; 1,1-DICHLOROETHENE; 1,1-DICHLOROETHYLENE; VDC; VINYLIDENE CHLORIDE MONOMER; VINYLIDENE DICHLORIDE; VINYLIDENE CHLORIDE, INHIBITED; RCRA U078; UN 1303; C2H2CL2; MAT25070; RTECS KV9275000

CHEMICAL FAMILY: halogens

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: VINYLIDENE CHLORIDE
CAS NUMBER: 75-35-4
PERCENTAGE: >99.9

COMPONENT: 4-METHOXYPHENOL
CAS NUMBER: 150-76-5
PERCENTAGE: 0.02000

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=2

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: volatile liquid
ODOR: faint odor, sweet odor
MAJOR HEALTH HAZARDS: harmful if swallowed, respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire. May polymerize. Containers may rupture or explode. May form peroxides during prolonged storage.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, symptoms of drunkenness, lung congestion, liver damage, convulsions
LONG TERM EXPOSURE: kidney damage, tumors
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation (possibly severe)
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation (possibly severe), eye damage
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: symptoms of drunkenness, liver damage
LONG TERM EXPOSURE: same as effects reported in short term exposure

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point. Containers may rupture or explode if exposed to heat.

EXTINGUISHING MEDIA: alcohol-resistant foam, carbon dioxide, regular dry chemical, water

Large fires: Use alcohol-resistant foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool

containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT: 14 F (-10 C)
LOWER FLAMMABLE LIMIT: 5.6%
UPPER FLAMMABLE LIMIT: 11.4%
AUTOIGNITION: 855 F (457 C)
FLAMMABILITY CLASS (OSHA): IA

6. ACCIDENTAL RELEASE MEASURES

AIR RELEASE:
Reduce vapors with water spray. Stay upwind and keep out of low areas.

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:
Collect with absorbent into suitable container. Collect spilled material using mechanical equipment.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Remove sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Store in a cool, dry place. Store in a well-ventilated area. Keep in the dark. Keep separated from incompatible substances. Store outside or in a detached building. Store with flammable liquids. Store in a tightly closed container. Containers must have overpressure release device. Avoid heat, flames, sparks and other sources of ignition. Keep separated

from incompatible substances. Monitor inhibitor content. Avoid exposure to low temperatures or freezing. May form explosive peroxides. Store in a tightly closed container. Avoid contact with light. Store in a cool, dry place. Monitor inhibitor content. Do not evaporate or distill to dryness. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
VINYLIDENE CHLORIDE:
1 ppm (4 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
5 ppm ACGIH TWA
NIOSH TWA (lowest feasible concentration)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
At any detectable concentration -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
PHYSICAL FORM: volatile liquid
ODOR: faint odor, sweet odor
MOLECULAR WEIGHT: 96.64
MOLECULAR FORMULA: C2-H2-CL2
BOILING POINT: 86-90 F (30-32 C)
FREEZING POINT: -188 F (-122 C)
VAPOR PRESSURE: 400 mmHg @ 14.8 C
VAPOR DENSITY (air=1): 3.4
SPECIFIC GRAVITY (water=1): 1.213
WATER SOLUBILITY: 0.04% @ 20 C
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: 500 ppm
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: organic solvents

10. STABILITY AND REACTIVITY

REACTIVITY: May form explosive peroxides. Avoid contact with temperatures above -40 C. Avoid contact with heat, air, light or moisture and monitor inhibitor content. May polymerize. Closed containers may rupture violently.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: metals, acids, oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

VINYLIDENE CHLORIDE:
TOXICITY DATA: 10000 mg/m3 inhalation-rat LC50; 200 mg/kg oral-rat LD50
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3;

ACGIH: A4 -Not Classifiable as a Human Carcinogen
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Toxic: inhalation, ingestion
TARGET ORGANS: central nervous system, liver
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 74000 ug/L 96 hour(s) LC50 (Mortality) Bluegill (Lepomis macrochirus)

INVERTEBRATE TOXICITY: 224000 ug/L 96 hour(s) LC50 (Mortality) Opossum shrimp (Mysidopsis bahia)

ALGAL TOXICITY: >712000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (Skeletonema costatum)

ENVIRONMENTAL SUMMARY: Moderately toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U078. Hazardous Waste Number(s): D029. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.7 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Vinylidene chloride, stabilized
ID NUMBER: UN1303
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: I
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Vinylidene chloride, stabilized
UN NUMBER: UN1303
CLASS: 3
PACKING GROUP/CATEGORY: I

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
VINYLIDINE CHLORIDE: 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65):
VINYLIDINE CHLORIDE

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: BD2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION:
VINYLIDENE CHLORIDE
CAS NUMBER: 75-35-4
SECTION 4

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: CIS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:
CIS-ACETYLENE DICHLORIDE; 1,2-DICHLOROETHYLENE; C2H2CL2; MAT05125; RTECS KV9420000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CIS-1,2-DICHLOROETHYLENE
CAS NUMBER: 156-59-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: pleasant odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire. May react on contact with air, heat, light or water.

POTENTIAL HEALTH EFFECTS:
INHALATION:

SHORT TERM EXPOSURE: irritation, nausea, vomiting, drowsiness, symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Moderate explosion hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any

discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT: 39 F (4 C) (CC)
LOWER FLAMMABLE LIMIT: 9.7%
UPPER FLAMMABLE LIMIT: 12.8%
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CIS-1,2-DICHLOROETHYLENE:
1,2-DICHLOROETHYLENE (ALL ISOMERS):
200 ppm (790 mg/m3) OSHA TWA
200 ppm ACGIH TWA
200 ppm (790 mg/m3) NIOSH recommended TWA 10 hour(s)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
2000 ppm
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: pleasant odor
MOLECULAR WEIGHT: 96.94
MOLECULAR FORMULA: C2-H2-CL2
BOILING POINT: 140 F (60 C)
FREEZING POINT: -114 F (-81 C)
VAPOR PRESSURE: 400 mmHg @ 41 C
VAPOR DENSITY (air=1): 3.34
SPECIFIC GRAVITY (water=1): 1.2837
WATER SOLUBILITY: insoluble
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: acetone, benzene, ether, alcohol

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials, acids

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION

CIS-1,2-DICHLOROETHYLENE:
TOXICITY DATA: 13700 ppm inhalation-rat LC50
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Slightly Toxic: inhalation
TARGET ORGANS: central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
MUTAGENIC DATA: Available.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: 1,2-Dichloroethylene
ID NUMBER: UN1150
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: 1,2-Dichloroethylene
UN NUMBER: UN1150
CLASS: 3
PACKING GROUP/CATEGORY: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
1,2-DICHLOROETHYLENE (ALL ISOMERS)

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: BD2

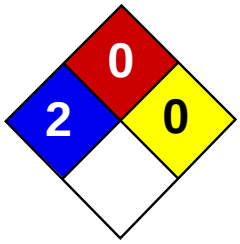
NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MATHESON TRI-GAS, INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES, GUARANTEES OR REPRESENTATIONS REGARDING THE PRODUCT OR THE INFORMATION HEREIN, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE. MATHESON TRI-GAS, INC. SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE, WHETHER COMPENSATORY, CONSEQUENTIAL, EXEMPLARY, OR OTHERWISE, RESULTING FROM ANY PUBLICATION, USE OR RELIANCE UPON THE INFORMATION HEREIN.



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 Publishe 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. Symtoms 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, disorentiation, seizures, enotional 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 extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead 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: 05/21/2013 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

Vinyl Chloride (Chloroethylene)

Section 1. Chemical product and company identification

Product name : Vinyl Chloride (Chloroethylene)

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 : Ethylene, chloro-; Chloroethene; Chloroethylene; Monochloroethylene; Vinyl chloride; Vinyl chloride monomer; Vinyl C monomer; C2H3Cl; Ethylene monochloride; Monochloroethene; Chlorethene; Chlorethylene; Chlorure de vinyle; Cloruro di vinile; Rcra waste number U043; Trovidur; UN 1086; VC; VCM; Vinile; Vinylchlorid; Vinyl chloride, inhibited; Vinyle(chlorure de); Winylu chlorek; 1-Chloroethylene

MSDS # : 001067

Date of Preparation/Revision : **4/27/2010.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. [COLORLESS GAS OR LIQUID (BELOW 7 F) WITH A PLEASANT ODOR AT HIGH CONCENTRATIONS. [NOTE: SHIPPED AS A LIQUEFIED COMPRESSED GAS.]]

Emergency overview : WARNING!

FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
HARMFUL IF SWALLOWED.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CANCER HAZARD - CAN CAUSE CANCER.
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. Risk of cancer depends on duration and level of exposure. 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: blood, kidneys, liver, mucous membranes, lymphatic system, upper respiratory tract, skin, eyes, central nervous system (CNS).

Routes of entry : Inhalation

Potential acute health effects

Eyes : Irritating to eyes.

Skin : Irritating to skin.

Inhalation : Acts as a simple asphyxiant.

Ingestion : Ingestion is not a normal route of exposure for gases

Potential chronic health effects : **CARCINOGENIC EFFECTS**: Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union.
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

Name	CAS number	% Volume	Exposure limits
Vinyl Chloride (Chloroethylene)	75-01-4	100	**ACGIH TLV (United States, 1/2009).** TWA: 1 ppm 8 hour(s). **OSHA PEL (United States, 11/2006).** STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minute(s). TWA: 1 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 : 471.85°C (881.3°F)

Flash point : Open cup: -79.15°C (-110.5°F).

Flammable limits : Lower: 4% Upper: 22%

Products of combustion : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds

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.

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. High pressure gas. 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

vinyl chloride

ACGIH TLV (United States, 1/2009).
TWA: 1 ppm 8 hour(s).
OSHA PEL (United States, 11/2006).
STEL: 5 ppm 15 minute(s).
TWA: 1 ppm 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
STEL: 5 ppm 15 minute(s).
TWA: 1 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight : 62.5 g/mole

Molecular formula : C2-H3-Cl

Boiling/condensation point : -13.8°C (7.2°F)

Melting/freezing point : -160°C (-256°F)

Critical temperature : 158.5°C (317.3°F)

Vapor density : 2.21 (Air = 1)

Specific Volume (ft^3/lb) : 6.25

Gas Density (lb/ft^3) : 0.16

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
vinyl chloride	LD50 Oral	Rat	500 mg/kg	-
	LC50 Inhalation Gas.	Rat	18 pph	15 minutes
	LC50 Inhalation Gas.	Rat	5000 ppm	1 hours

Chronic effects on humans : **CARCINOGENIC EFFECTS**: Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, lymphatic system, upper respiratory tract, skin, eyes, 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 : Can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Products of degradation : Products of degradation: carbon oxides (CO, CO_2) 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	UN1086	VINYL CHLORIDE, STABILIZED	2.1	Not applicable (gas).		**Reportable quantity** 1 lb. (0.454 kg) **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** 21, B44, T50
TDG Classification	UN1086	VINYL CHLORIDE, STABILIZED	2.1	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Road or Rail Index** Forbidden
Mexico Classification	UN1086	VINYL CHLORIDE, STABILIZED	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: vinyl chloride
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: vinyl chloride: Fire hazard, reactive, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: vinyl chloride

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 accidental release prevention: vinyl chloride

Clean Air Act (CAA) 112 regulated flammable substances: vinyl chloride

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Vinyl Chloride (Chloroethylene)	75-01-4	100
Supplier notification	:	Vinyl Chloride (Chloroethylene)	75-01-4	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.

California Prop. 65 :

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Vinyl Chloride (Chloroethylene)	Yes.	No.	Yes.	No.

Canada

WHMIS (Canada) :

Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

CEPA Toxic substances: This material is 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

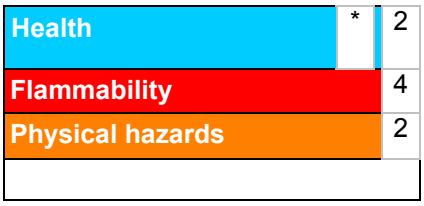
United States

Label requirements : FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
HARMFUL IF SWALLOWED.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CANCER HAZARD - CAN CAUSE CANCER.
CONTENTS UNDER PRESSURE.

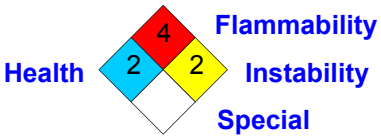
Canada

Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class F: Dangerously reactive material.

Hazardous Material Information System (U.S.A.) :



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.

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: TRICHLOROETHYLENE

TRADE NAMES/SYNONYMS:
MTG MSDS 199; ACETYLENE TRICHLORIDE; ETHYLENE TRICHLORIDE; 1-CHLORO-2,2-DICHLOROETHYLENE; 1,1-DICHLORO-2-CHLOROETHYLENE; TCE; ETHINYL TRICHLORIDE; TRICHLOROETHENE; 1,1,2-TRICHLOROETHYLENE; 1,1,2-TRICHLOROETHENE; UN 1710; RCRA U228; C2HCl3; MAT23850; RTECS KX4550000

CHEMICAL FAMILY: halogenated, alkenes

CREATION DATE: Jan 24 1989
REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TRICHLOROETHYLENE
CAS NUMBER: 79-01-6
PERCENTAGE: >99

COMPONENT: INHIBITORS
CAS NUMBER: Not assigned.
PERCENTAGE: <0.1

COMPONENT: AMINES
CAS NUMBER: Not assigned.
PERCENTAGE: <0.1

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

EMERGENCY OVERVIEW:

COLOR: colorless
PHYSICAL FORM: liquid
ODOR: sweet odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, allergic reactions, cancer hazard (in humans)
PHYSICAL HAZARDS: May polymerize. Containers may rupture or explode. May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, changes in blood pressure, nausea, vomiting, stomach pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, mood swings, tremors, loss of coordination, visual disturbances, bluish skin color, lung congestion, kidney damage, liver damage, unconsciousness, coma
LONG TERM EXPOSURE: same as effects reported in short term exposure, loss of appetite, weight loss, blood disorders, brain damage, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation, allergic reactions
LONG TERM EXPOSURE: irritation, allergic reactions, nausea, loss of appetite, weight loss, difficulty breathing, headache, drowsiness, dizziness, joint pain, loss of coordination, visual disturbances, paralysis
EYE CONTACT:
SHORT TERM EXPOSURE: irritation (possibly severe), blurred vision
LONG TERM EXPOSURE: irritation (possibly severe), eye damage
INGESTION:
SHORT TERM EXPOSURE: same as effects reported in short term inhalation
LONG TERM EXPOSURE: same as effects reported in long term inhalation

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

FLASH POINT: No data available.
LOWER FLAMMABLE LIMIT: 7.8% @ 100 C
UPPER FLAMMABLE LIMIT: 52% @ 100 C
AUTOIGNITION: 770 F (410 C)

6. ACCIDENTAL RELEASE MEASURES

AIR RELEASE:
Reduce vapors with water spray. Collect runoff for disposal as potential hazardous waste.

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:
Absorb with activated carbon. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
TRICHLOROETHYLENE:
100 ppm OSHA TWA
200 ppm OSHA ceiling
300 ppm OSHA peak (5 minutes in any 2 hours)
50 ppm (269 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
200 ppm (1070 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
10 ppm ACGIH TWA
25 ppm ACGIH STEL
25 ppm NIOSH TWA 10 hour(s)
2 ppm NIOSH ceiling 60 minute(s) (used as halogenated anesthetic gas)

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
At any detectable concentration -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: sweet odor
MOLECULAR WEIGHT: 131.39
MOLECULAR FORMULA: Cl-C-H-C-Cl2
BOILING POINT: 189 F (87 C)
FREEZING POINT: -99 F (-73 C)
VAPOR PRESSURE: 58 mmHg @ 20 C
VAPOR DENSITY (air=1): 4.53
SPECIFIC GRAVITY (water=1): 1.4642
WATER SOLUBILITY: 0.1%
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: 21 ppm
EVAPORATION RATE: 0.69 (carbon tetrachloride=1)
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, acetone, chloroform, benzene, vegetable oils

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

TRICHLOROETHYLENE:
IRRITATION DATA: 2 mg/24 hour(s) skin-rabbit severe; 20 mg/24 hour(s) eyes-rabbit moderate
TOXICITY DATA: 140700 mg/m3/1 hour(s) inhalation-rat LC50; >20 gm/kg skin-rabbit LD50; 4920 mg/kg oral-rat LD50
CARCINOGEN STATUS: NTP: Anticipated Human Carcinogen; IARC: Human Limited Evidence,

Animal Sufficient Evidence, Group 2A; ACGIH: A2 -Suspected Human Carcinogen
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
Slightly Toxic: inhalation
Relatively Non-toxic: dermal absorption
TARGET ORGANS: immune system (sensitizer), central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: heart problems
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.
ADDITIONAL DATA: May cross the placenta. Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 3100 ug/L 96 hour(s) LC50 (Mortality) Flagfish (Jordanella floridae)

INVERTEBRATE TOXICITY: 1700 ug/L 7 hour(s) EC50 (Regeneration) Flatworm (Dugesia japonica)

OTHER TOXICITY: 45000 ug/L 48 week(s) LC50 (Mortality) Clawed toad (Xenopus laevis)

FATE AND TRANSPORT:
BIOCONCENTRATION: 17 ug/L 1-14 hour(s) BCF (Residue) Bluegill (Lepomis macrochirus) 8.23 ug/L

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U228. Hazardous Waste Number(s): D040. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.5 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Trichloroethylene
ID NUMBER: UN1710
HAZARD CLASS OR DIVISION: 6.1
PACKING GROUP: III
LABELING REQUIREMENTS: 6.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Trichloroethylene
UN NUMBER: UN1710
CLASS: 6.1
PACKING GROUP/CATEGORY: III

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
TRICHLOROETHYLENE: 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: Yes
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
TRICHLOROETHYLENE

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
TRICHLOROETHYLENE
Cancer (Apr 01, 1988)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: D2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

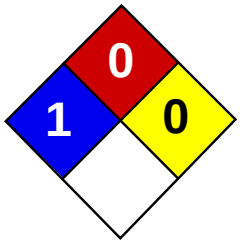
TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

"RTECS®" is a United States trademark owned and licensed under authority of the U.S. Government, by and through Symyx Software, Inc. Portions ©Copyright 2001, U.S. Government. All rights reserved.

MATHESON TRI-GAS, INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES, GUARANTEES OR REPRESENTATIONS REGARDING THE PRODUCT OR THE INFORMATION HEREIN, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE. MATHESON TRI-GAS, INC. SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE, WHETHER COMPENSATORY, CONSEQUENTIAL, EXEMPLARY, OR OTHERWISE, RESULTING FROM ANY PUBLICATION, USE OR RELIANCE UPON THE INFORMATION HEREIN.



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

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
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

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

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, 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: 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. 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: Non-flammable in presence of open flames and sparks, of shocks, of heat.

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: When heated to decomposition it emits highly toxic fumes of lead.

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. 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. 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. 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:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

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

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

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

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (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.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly 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: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

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:
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: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 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: Lead 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: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

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

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

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

Health: 1

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. Safety glasses.

Section 16: Other Information

References: Not available.

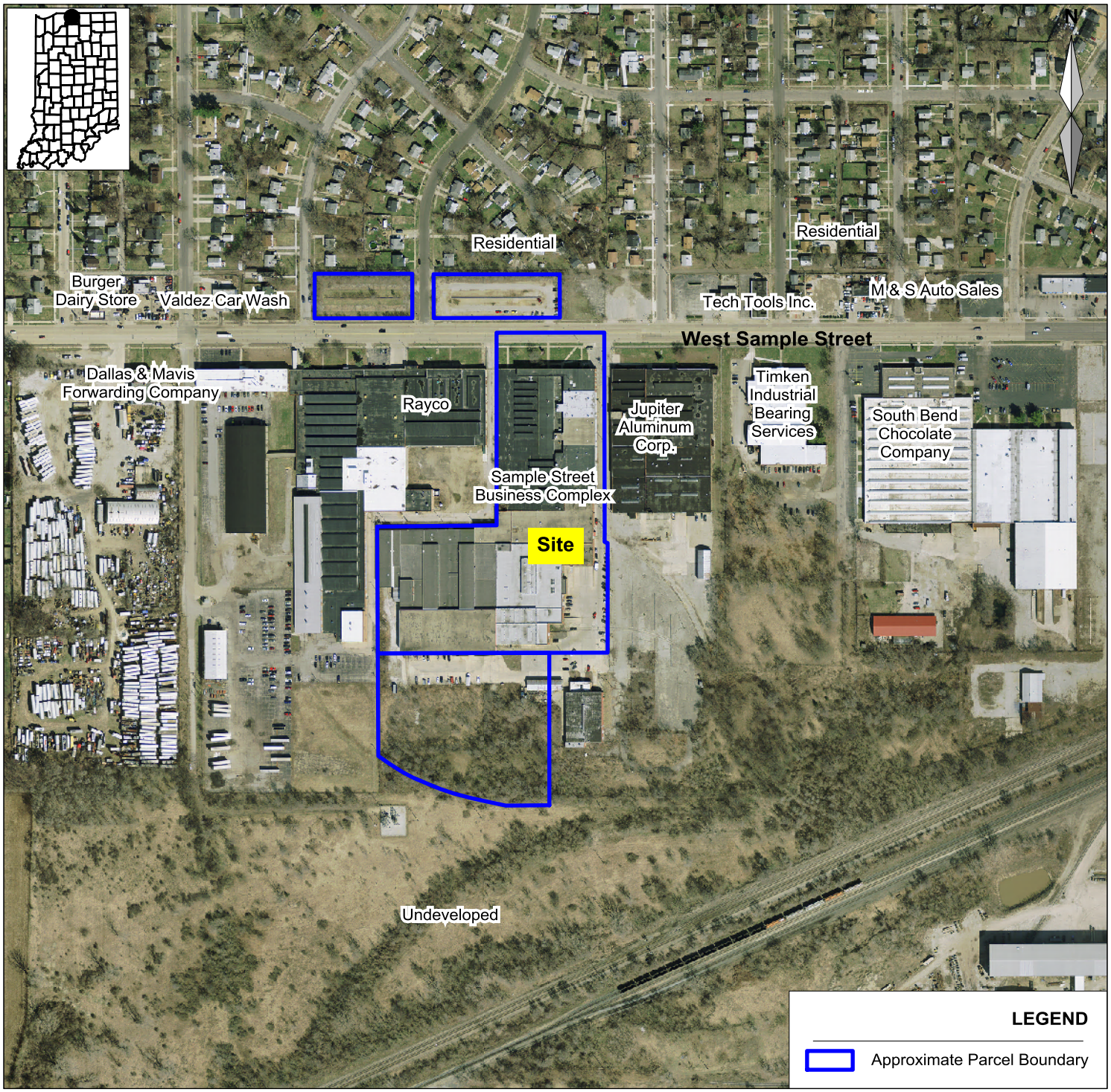
Other Special Considerations: Not available.

Created: 10/10/2005 08:21 PM

Last Updated: 05/21/2013 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.

ATTACHMENT B
Site Map



0 500 ft US

Location
Saint Joseph County, Portage Township
SOUTH BEND WEST Quadrangle
Section 16 T 37N R 2E

Base Map: 2011 IndianaMap Orthophotography and LIDAR

Heartland Environmental Associates, Inc.
3410 Mishawaka Ave.
South Bend, IN 46615

Figure 2
Site Map and
Adjacent Properties
Sample Street Business Complex
3702 West Sample Street
South Bend, Indiana 46619

Client:
Urban Enterprise Assoc.,
of South Bend, Inc.

Date:
8/8/2013

Drawn by:
JRB

Scale:
1 in : 400.00 ft

ATTACHMENT C
Hospital and Emergency Phone Numbers

Emergency Phone Numbers

Memorial Hospital of South Bend
615 N. Michigan Street
South Bend, IN 46601
(574) 647-1000

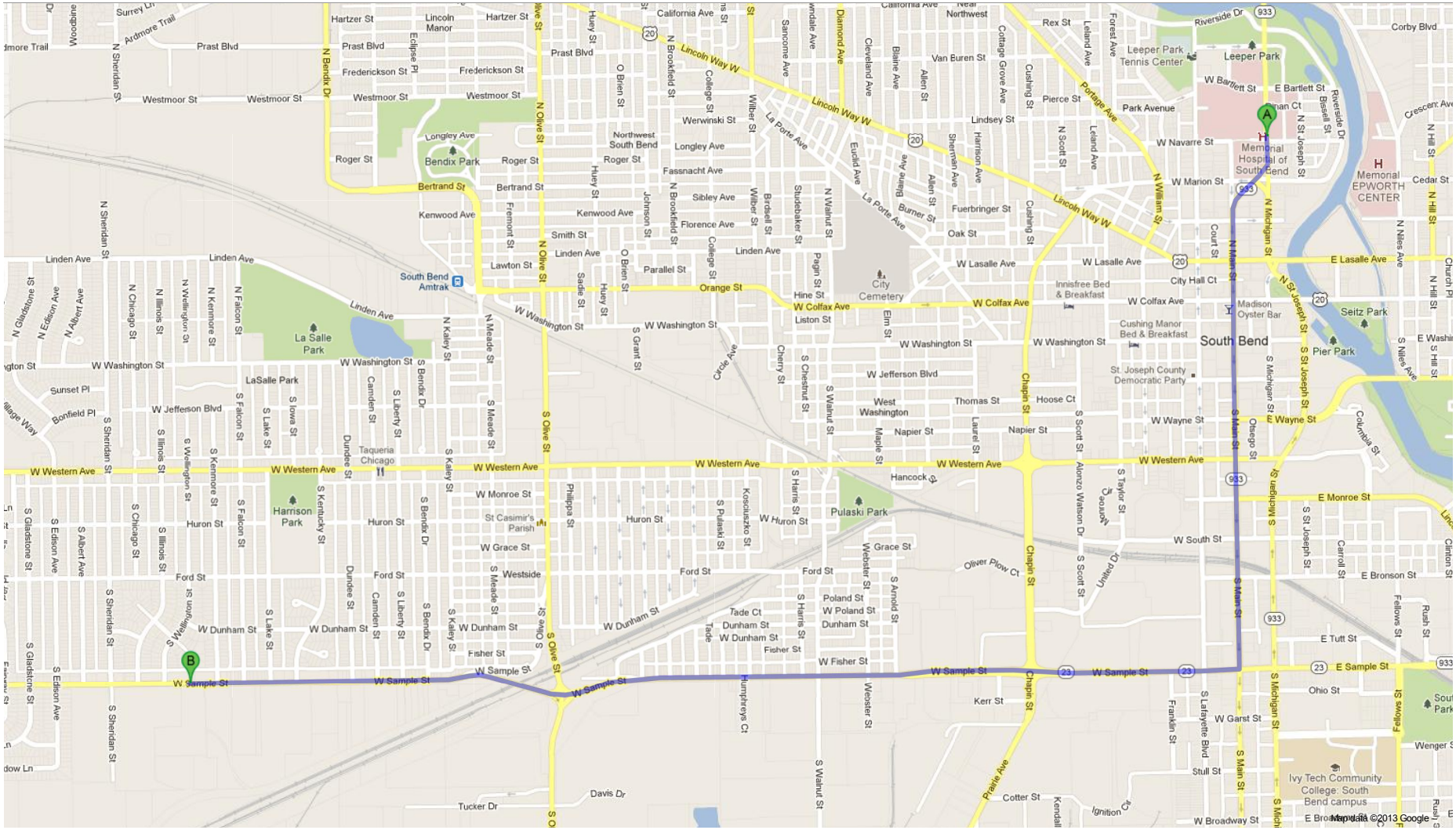
South Bend Fire Department
4302 West Western Avenue
South Bend
(574) 235-9691

South Bend Police Department
701 W Sample Street,
South Bend IN 4660
Non Emergency 574.235.9201
Emergency 911

Heartland Environmental Associates, Inc.
3410 Mishawaka Avenue
South Bend, IN 46615
888-289-1191
fax: 574-289-7480

Google

To see all the details that are visible on the screen, use the "Print" link next to the map.



Driving directions to 3702 W Sample St, South Bend, IN 46619

3D

Memorial Hospital-South Bend
615 N Michigan St
South Bend, IN 46601

(574) 647-1000

1. Head **south** on **N Michigan St** toward **E Navarre St** — 351 ft
2. Slight right onto **IN-933 S** — 1.2 mi
3. Turn right onto **W Sample St**
Destination will be on the left — 2.5 mi