Right to Know

Hazardous Substance Fact Sheet

Common Name: **TETRAMETHYL LEAD**

Synonyms: Lead Tetramethyl; TML

Chemical Name: Plumbane, Tetramethyl-

Date: March 2002 Revision: October 2007

CAS Number: 75-74-1

RTK Substance Number: 1831

DOT Number: UN 1649

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Description and Use

Tetramethyl Lead is a colorless liquid with a slightly fruity or musty odor. It is used as an anti-knock agent in aviation and premium gasolines. It is no longer produced in the United States due to environmental concerns.

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	3	2
FLAMMABILITY	-	3
REACTIVITY	-	3 W

CARCINOGEN
FLAMMABLE
REACTIVE
POISONOUS GASES ARE PRODUCED IN FIRE
CONTAINERS MAY EXPLODE IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

Reasons for Citation

- **Tetramethyl Lead** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IARC, NFPA and EPA.
- This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while rinsing.

Skin Contact

- Remove contaminated clothing. Wash contaminated skin with soap and water.

Inhalation

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222
CHEMTREC: 1-800-424-9300
NJDEP Hotline: 1-877-927-6337
National Response Center: 1-800-424-8802

- **Tetramethyl Lead** can affect you when inhaled or swallowed and may be absorbed through the skin.
- **Tetramethyl Lead** is a CARCINOGEN--HANDLE WITH EXTREME CAUTION.
- Contact may irritate the skin.
- Contact can irritate the eyes with possible loss of vision.
- Exposure can cause headache, irritability, and muscle and joint pain.
- Repeated exposure can cause *Lead poisoning* with metallic taste, colic and muscle cramps.
- **Tetramethyl Lead** may damage the nervous system.
- Exposure may cause kidney and brain damage, and anemia.
- **Tetramethyl Lead** is FLAMMABLE and REACTIVE and a DANGEROUS FIRE and EXPLOSION HAZARD.
- **Tetramethyl Lead** may decompose in WATER to release heat and may explode.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.075 mg/m^3** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit (REL) is **0.075 mg/m^3** averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **0.15 mg/m^3** averaged over an 8-hour workshift.

- **Tetramethyl Lead** is a PROBABLE CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

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

Health Hazard Information

Acute Health Effects
The following acute (short-term) health effects may occur immediately or shortly after exposure to **Tetramethyl Lead**:

- Contact may irritate the skin.
- Contact can irritate the eyes with possible loss of vision.
- Exposure can cause headache, irritability, reduced memory, disturbed sleep, and mood and personality changes.
- Contact can cause upset stomach, poor appetite, weakness and fatigue.

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

Cancer Hazard
- **Tetramethyl Lead** is a PROBABLE CARCINOGEN in humans. There is some evidence that *Lead compounds* cause lung cancer in humans and they have been shown to cause kidney cancer in animals.
- Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard
- While **Tetramethyl Lead** has not been identified as a teratogen or a reproductive hazard, *Lead* and certain *Lead compounds* are teratogens and may also cause reproductive damage, such as reduced fertility and interference with menstrual cycles. **Tetramethyl Lead** should be handled WITH EXTREME CAUTION.

Other Effects
- Repeated exposure to **Tetramethyl Lead** can cause *Lead poisoning*. Symptoms include metallic taste, poor appetite, weight loss, colic, nausea, vomiting, and muscle cramps.
- Higher levels can cause muscle and joint pain, and weakness.
- High or repeated exposure may damage the nerves causing weakness, "pins and needles," and poor coordination in the arms and legs.
- *Lead* exposure increases the risk of high blood pressure.
- **Tetramethyl Lead** may cause kidney and brain damage, and damage to the blood cells causing anemia.
- Repeated exposure causes *Lead* to accumulate in the body. It can take years for the body to get rid of excess *Lead*.

Medical

Medical Testing
For frequent or potentially high exposure (half the PEL or greater), the following are recommended before beginning work and at regular times after that:

- Urine test for *Lead* (should be less than **150 micrograms per deciliter**).
- Exam of the nervous system
- Kidney function tests
- Complete blood count

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

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures
- Body exposures to *Lead* from hobbies using *Lead* solder or pigments, target practice, and drinking moonshine made in *Leaded* containers will increase *Lead* levels. Repeated breathing or handling of *Leaded* gasoline may also add to body *Lead* levels.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- Label process containers.
- Provide employees with hazard information and training.
- Monitor airborne chemical concentrations.
- Use engineering controls if concentrations exceed recommended exposure levels.
- Provide eye wash fountains and emergency showers.
- Wash or shower if skin comes in contact with a hazardous material.
- Always wash at the end of the workshift.
- Change into clean clothing if clothing becomes contaminated.
- Do not take contaminated clothing home.
- Get special training to wash contaminated clothing.
- Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- Before entering a confined space where **Tetramethyl Lead** may be present, check to make sure that an explosive concentration does not exist.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

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

Gloves and Clothing

- Avoid skin contact with **Tetramethyl Lead**. Wear personal protective equipment made from material which can not be permeated and/or degraded by this substance. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- Safety equipment manufacturers recommend DuPont *Tychem® Responder®*, *CSM*, and *TK* as protective materials for *heavy liquid toxics* and *corrosives*.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- Where the potential exists for exposure over **0.075 mg/m^3**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- Exposure to **40 mg/m^3** (as *Lead*) is immediately dangerous to life and health. If the possibility of exposure above **40 mg/m^3** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- **Tetramethyl Lead** is a FLAMMABLE LIQUID.
- Use dry chemical, CO_2, water spray or foam as extinguishing agents.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Lead Oxides*.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray to keep fire-exposed containers cool.
- Vapors may travel to a source of ignition and flash back.
- Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Tetramethyl Lead** is spilled or leaked, take the following steps:

- Evacuate personnel and secure and control entrance to the area.
- Eliminate all ignition sources.
- Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
- Keep **Tetramethyl Lead** out of confined spaces, such as sewers, because of the possibility of an explosion.
- Ventilate and wash area after clean-up is complete.
- It may be necessary to contain and dispose of **Tetramethyl Lead** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Tetramethyl Lead** you should be trained on its proper handling and storage.

- **Tetramethyl Lead** decomposes in WATER to produce heat and may explode.
- **Tetramethyl Lead** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); TETRACHLOROTRIFLUOROMETHYL PHOSPHORANE; SULFURYL CHLORIDE; and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) to cause fires and explosions.
- **Tetramethyl Lead** is not compatible with COMBUSTIBLES; RUBBER; METALS; and METAL OXIDES.
- Store in tightly closed containers in a cool, well-ventilated area away from SUNLIGHT and HEAT as **Tetramethyl Lead** decomposes above 212^{o}F (100^{o}C).
- Sources of ignition, such as smoking and open flames, are prohibited where **Tetramethyl Lead** is used, handled, or stored.
- Metal containers involving the transfer of **Tetramethyl Lead** should be grounded and bonded.
- Use explosion-proof electrical equipment and fittings wherever **Tetramethyl Lead** is used, handled, manufactured, or stored.
- Use only non-sparking tools and equipment, especially when opening and closing containers of **Tetramethyl Lead**.

Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
Right to Know
PO Box 368
Trenton, NJ 08625-0368
Phone: 609-984-2202
Fax: 609-984-7407
E-mail: rtk@doh.state.nj.us
Web address: http://www.nj.gov/health/eoh/rtkweb

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGLs) are established by the EPA. They describe the risk to humans resulting from once-in-a lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

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

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

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

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

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

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

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

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

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

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

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

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or **Lower Explosive Limit**, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

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

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

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

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

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

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

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

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

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

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

UEL or **Upper Explosive Limit** is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

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

Right to Know Hazardous Substance Fact Sheet

Emergency Responders Quick Reference

Common Name: **TETRAMETHYL LEAD**

Synonyms: Lead Tetramethyl; TML
CAS No: 75-74-1
Molecular Formula: $Pb(CH_3)_4$
RTK Substance No: 1831
Description: Colorless liquid with a slightly fruity or musty odor.

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
3 - Health **3 - Fire** **3 ~~W~~ - Reactivity** **DOT#:** UN 1649 **ERG Guide #:** 131 **Hazard Class:** 6.1 (Poison)	Use dry chemical, CO_2, water spray or foam as extinguishing agent. POISONOUS GASES ARE PRODUCED IN FIRE, including *Lead Oxides*. CONTAINERS MAY EXPLODE IN FIRE. Use water spray to keep fire-exposed containers cool. Vapors may travel to a source of ignition and flash back. Vapor is heavier than air and may travel a distance to cause a fire or explosion far from the source.	**Tetramethyl Lead** decomposes in WATER to produce heat and may explode. **Tetramethyl Lead** reacts with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); TETRACHLOROTRIFLUOROMETHYL PHOSPHORANE; SULFURYL CHLORIDE and STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC) to cause fires and explosions. **Tetramethyl Lead** is not compatible with COMBUSTIBLES; RUBBER; METALS; and METAL OXIDES.

SPILL/LEAKS

Isolation Distance: 25 to 50 meters (80 to 160 feet)

Absorb liquid in sand or inert absorbent.

Toxic to aquatic organisms.

Hazardous to the environment and persists in the environment.

PHYSICAL PROPERTIES

Boiling Point:	230°F (110°C)
Flash Point:	100°F (37.8°C)
LEL:	1.8%
UEL:	No information
Specific Gravity:	1.9 (water = 1)
Relative Vapor Density:	6.5 (air =1)
Vapor Pressure:	23 mm Hg at 68°F (20°C)
Solubility:	Insoluble
Melting Point:	-17.5°F (-27.5°C)

EXPOSURE LIMITS

OSHA:	0.075 mg/m^3, 8-hr TWA
NIOSH:	0.075 mg/m^3, 10-hr TWA
ACGIH:	0.15 mg/m^3, 8-hr TWA
IDLH LEVEL:	40 mg/m^3 (as *Lead*)

PROTECTIVE EQUIPMENT

Gloves:	No information
Coveralls:	DuPont Tychem® Responder®, CSM, and TK for heavy *liquid toxics* and *corrosives*
Boots:	No information
Respirator:	>0.075 mg/m^3 - Supplied air

HEALTH EFFECTS

Eyes:	Irritation, possible loss of vision
Skin:	Irritation
Acute:	Headache, irritability, upset stomach, and weakness
Chronic:	*Lead compounds* may cause lung cancer in humans Metallic taste, colic and muscle cramps Damage to the nervous system

FIRST AID AND DECONTAMINATION

Remove the person from exposure.

Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn.

Remove contaminated clothing and wash contaminated skin with soap and water.

Begin artificial respiration if breathing has stopped and CPR if necessary.

Transfer to a medical facility.