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: THIOPHENE

TRADE NAMES/SYNONYMS:  
MTG MSDS 195; THIOFURAN; THIOFURFURAN; DIVINYLENE SULFIDE; THIAPHENE;  
BUTYLENE SULFIDE; THIACYCLOPENTADIENE; THIOFURAM; THIOTETROLE;  
THIOPHURANE; THIOPHEN; THIOLE; UN 2414; MAT23380; RTECS XM7350000

CHEMICAL FAMILY: heterocyclic, sulfur

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

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: THIOPHENE  
CAS NUMBER: 110-02-1  
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:  
COLOR: colorless  
PHYSICAL FORM: liquid  
ODOR: faint odor, sweet odor  
MAJOR HEALTH HAZARDS: harmful if inhaled, central nervous system depression  
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:  
INHALATION:  
SHORT TERM EXPOSURE: irritation, sore throat, cough, headache, dizziness, drowsiness, loss of
coordination, weakness, tremors, unconsciousness

LONG TERM EXPOSURE: cardiovascular system effects, liver effects, nerve damage

SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: no information is available

EYE CONTACT:
SHORT TERM EXPOSURE: irritation, sensitivity to light
LONG TERM EXPOSURE: no information is available

INGESTION:
SHORT TERM EXPOSURE: no information on significant adverse effects
LONG TERM EXPOSURE: liver effects, kidney effects, heart disorders

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. 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.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

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.

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. Dike for later disposal. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. 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.

**FLASH POINT:** 30 F (-1 C) (CC)
**LOWER FLAMMABLE LIMIT:** 1.5%
**UPPER FLAMMABLE LIMIT:** 12.5%
**AUTOIGNITION:** 743 F (395 C)
**FLAMMABILITY CLASS (OSHA):** IB

**HAZARDOUS COMBUSTION PRODUCTS:**
Thermal decomposition or combustion products: oxides of carbon, oxides of sulfur

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**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.

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**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.

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**8. EXPOSURE CONTROLS, PERSONAL PROTECTION**

**EXPOSURE LIMITS:**
**THIOPHENE:**
No occupational exposure limits established.

**VENTILATION:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure 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: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.

Any chemical cartridge respirator with organic vapor cartridge(s).
Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.

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: faint odor, sweet odor
MOLECULAR WEIGHT: 84.14
MOLECULAR FORMULA: C4-H4-S
BOILING POINT: 183 F (84 C) @ 760 mmHg
FREEZING POINT: -38.9 F (-39.4 C)
VAPOR PRESSURE: 40 mmHg @ 12.5 C
VAPOR DENSITY (air=1): 2.9
SPECIFIC GRAVITY (water=1): 1.06494 @ 4 C
WATER SOLUBILITY: 3.020 g/L @ 25 C (insoluble)
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available
VISCOITY: 0.621 mPa.s
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, acetone, benzene, pyrimidines, ethanol, carbon tetrachloride, dioxane, toluene

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

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: combustible materials, oxidizing materials, nitrates, nitric acid
HAZARDOUS DECOMPOSITION:
Thermal decomposition or combustion products: oxides of carbon, oxides of sulfur

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

THIOPHENE:
TOXICITY DATA: 9500 mg/m3/2 hour(s) inhalation-mouse LC50; >20 ml/kg skin-guinea pig LD50; 1400 mg/kg oral-rat LD50
ACUTE TOXICITY LEVEL:
Toxic: inhalation
Moderately Toxic: ingestion
TARGET ORGANS: central nervous system

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 27000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis)
INVERTEBRATE TOXICITY: 318000 ug/L 48 week(s) LC50 (Mortality) Water flea (Daphnia magna)
ALGAL TOXICITY: 1000000 ug/L 4 week(s) (Photosynthesis) Green algae (Selenastrum capricornutum)

FATE AND TRANSPORT:
KOW: 14454.40 (log = 4.17) (estimated from water solubility)
KOC: 230 (log = 2.37) estimated
HENRY'S LAW CONSTANT: 2.9 E -3
BIOCONCENTRATION: 6.78 (estimated from water solubility)

ENVIRONMENTAL SUMMARY: Leaches through the soil or the sediment at a moderate rate. Accumulates very little in the bodies of living organisms. Highly volatile from water.

13. DISPOSAL CONSIDERATIONS

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

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Thiophene
ID NUMBER: UN2414
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Thiophene
UN NUMBER: UN2414
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 SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No


STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: B2.
NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Listed on DSL.

16. OTHER INFORMATION

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