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: ETHYL FORMATE

TRADE NAMES/SYNONYMS:
MTG MDSD 183; FORMIC ACID, ETHYL ESTER; ETHYL METHANOATE; AREGINAL; ETHYL FORMIC ESTER; FORMIC ETHER; STCC 4908167; UN 1190; MAT08990; RTECS LQ8400000

CHEMICAL FAMILY: esters, carboxylic, aliphatic

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

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: ETHYL FORMATE
CAS NUMBER: 109-94-4
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: distinct 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.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, vomiting, headache, drowsiness, symptoms of
drunkenness
LONG TERM EXPOSURE: no information is available
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: sore throat, nausea, stomach pain, symptoms of drunkenness
LONG TERM EXPOSURE: no information is available

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: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When 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 and activated charcoal slurry.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire 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: alcohol-resistant foam, carbon dioxide, regular dry chemical, water, alcohol-resistant foam

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).
Water may be ineffective.

FLASH POINT: -4 F (-20 C) (CC)
LOWER FLAMMABLE LIMIT: 2.8%
UPPER FLAMMABLE LIMIT: 16%
AUTOIGNITION: 851 F (455 C)
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

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.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
ETHYL FORMATE:
100 ppm (300 mg/m3) OSHA TWA
100 ppm ACGIH TWA
100 ppm (300 mg/m3) NIOSH recommended TWA 10 hour(s)

VENTILATION: Provide local exhaust or process enclosure 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.

**1500 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.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**

**PHYSICAL STATE:** liquid
**COLOR:** colorless
**ODOR:** distinct odor, pleasant odor
**MOLECULAR WEIGHT:** 74.09
**MOLECULAR FORMULA:** C3-H6-O2
**BOILING POINT:** 129 F (54 C)
**FREEZING POINT:** -110 F (-79 C)
**VAPOR PRESSURE:** 192.5 mmHg @ 20 C
**VAPOR DENSITY (air=1):** 2.6
**SPECIFIC GRAVITY (water=1):** 0.923
**WATER SOLUBILITY:** 10%
**PH:** Not available
**VOLATILITY:** Not available
**ODOR THRESHOLD:** Not available
**EVAPORATION RATE:** Not available
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available
**SOLVENT SOLUBILITY:**
**Soluble:** benzene, ether, alcohol

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**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.

**INCOMPATIBILITIES:** acids, bases, oxidizing materials

**HAZARDOUS DECOMPOSITION:**
Thermal decomposition products: oxides of carbon

**POLYMERIZATION:** Will not polymerize.

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### 11. TOXICOLOGICAL INFORMATION

**ETHYL FORMATE:**

**IRRITATION DATA:** 460 mg open skin-rabbit mild

**TOXICITY DATA:** 28950 mg/m3 inhalation-rat LC50; >20 ml/kg skin-rabbit LD50; 1850 mg/kg oral-rat LD50

**LOCAL EFFECTS:**
Irritant: inhalation, skin, eye

**ACUTE TOXICITY LEVEL:**
Moderately Toxic: inhalation, ingestion

**TARGET ORGANS:** central nervous system

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

**TUMORIGENIC DATA:** Available.

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### 12. ECOLOGICAL INFORMATION

Not available

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### 13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

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### 14. TRANSPORT INFORMATION

**U.S. DOT 49 CFR 172.101:**

**PROPER SHIPPING NAME:** Ethyl formate

**ID NUMBER:** UN1190

**HAZARD CLASS OR DIVISION:** 3

**PACKING GROUP:** II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Ethyl formate
UN NUMBER: UN1190
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: Not determined.

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

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