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: 1-BUTENE

TRADE NAMES/SYNONYMS:  
MTG MSDS 12; ALPHA-BUTYLENE; ETHYLETHYLENE; BUTYLENE; ALPHA-BUTENE; BUTENE-1; N-BUTENE; N-BUTYLENE; 1-BUTYLENE; UN 1012; C4H8; MAT25870

CHEMICAL FAMILY: hydrocarbons, aliphatic

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

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: 1-BUTENE  
CAS NUMBER: 106-98-9  
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
COLOR: colorless  
PHYSICAL FORM: gas  
ODOR: aromatic odor

MAJOR HEALTH HAZARDS: central nervous system depression, difficulty breathing

PHYSICAL HAZARDS: Flammable gas. May cause flash fire. Flash back hazard. Electrostatic charges may be generated by flow, agitation, etc. May polymerize. Containers may rupture or explode.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: mild irritation, nausea, vomiting, difficulty breathing, irregular heartbeat,
headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma  

**LONG TERM EXPOSURE:** no information on significant adverse effects

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** blisters, frostbite  
**LONG TERM EXPOSURE:** no information is available

**EYE CONTACT:**

**SHORT TERM EXPOSURE:** mild irritation, frostbite, blurred vision  
**LONG TERM EXPOSURE:** no information is available

**INGESTION:**

**SHORT TERM EXPOSURE:** ingestion of a gas is unlikely  
**LONG TERM EXPOSURE:** ingestion of a gas is unlikely

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### 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:** If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

**EYE CONTACT:** Contact with liquid: Immediately 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.

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### 5. FIRE FIGHTING MEASURES

**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Moderate explosion hazard. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Pressurized containers may rupture or explode if exposed to sufficient heat. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

**EXTINGUISHING MEDIA:** carbon dioxide, regular dry chemical

Large fires: 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: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammable. 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. 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. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 500 meters (1/3 mile). Consider downwind evacuation if material is leaking.

**FLASH POINT:** -112 °F (-80 °C)
**LOWER FLAMMABLE LIMIT:** 1.6 % by volume
**UPPER FLAMMABLE LIMIT:** 10.0 % by volume
**AUTOIGNITION:** 725 °F (385 °C)

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

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### 6. ACCIDENTAL RELEASE MEASURES

**OCCUPATIONAL RELEASE:**

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### 7. HANDLING AND STORAGE


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### 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE LIMITS:**
**1-BUTENE:**
**BUTENES, ALL ISOMERS:**
250 ppm ACGIH TWA

**VENTILATION:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.
EYE PROTECTION: For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

GLOVES: Wear insulated 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.

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

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICAL STATE</td>
<td>gas</td>
</tr>
<tr>
<td>COLOR</td>
<td>colorless</td>
</tr>
<tr>
<td>ODOR</td>
<td>aromatic odor</td>
</tr>
<tr>
<td>MOLECULAR WEIGHT</td>
<td>56.10</td>
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<tr>
<td>MOLECULAR FORMULA</td>
<td>C-H3-C-H2-C-H-C-H2</td>
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<tr>
<td>BOILING POINT</td>
<td>20.4 F (-6.47 C) @ 760 mmHg</td>
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<tr>
<td>FREEZING POINT</td>
<td>-301.5 F (-185.3 C)</td>
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<tr>
<td>VAPOR PRESSURE</td>
<td>3480 mmHg @ 21 C</td>
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<tr>
<td>VAPOR DENSITY (air=1)</td>
<td>1.93</td>
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<tr>
<td>SPECIFIC GRAVITY (water=1)</td>
<td>0.577 @ 25 C</td>
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<tr>
<td>DENSITY</td>
<td>2.3655 kg/m3 @ 25 C</td>
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<tr>
<td>WATER SOLUBILITY</td>
<td>0.221 g/L @ 25 C (insoluble)</td>
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<tr>
<td>PH</td>
<td>Not applicable</td>
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<tr>
<td>VOLATILITY</td>
<td>Not applicable</td>
</tr>
<tr>
<td>ODOR THRESHOLD</td>
<td>69 ppb</td>
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<tr>
<td>EVAPORATION RATE</td>
<td>Not applicable</td>
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<tr>
<td>VISCOSITY</td>
<td>0.00763 cP @ 20 C</td>
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<td>COEFFICIENT OF WATER/OIL DISTRIBUTION</td>
<td>Not applicable</td>
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<tr>
<td>SOLVENT SOLUBILITY</td>
<td>Soluble: alcohol, ether, benzene</td>
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</table>

10. STABILITY AND REACTIVITY
**REACTIVITY:** Stable at normal temperatures and pressure.

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

**INCOMPATIBILITIES:** metal salts, oxidizing materials, halogens, acids

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

**POLYMERIZATION:** Polymerizes with evolution of heat. Avoid contact with incompatible materials.

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**11. TOXICOLOGICAL INFORMATION**

**1-BUTENE:**
**TARGET ORGANS:** central nervous system

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**12. ECOLOGICAL INFORMATION**

**FATE AND TRANSPORT:**
**KOW:** 2.40 (log = 0.383) estimated

**KOC:** 44 (log = 1.64) estimated

**HENRY'S LAW CONSTANT:** 2.5 E -1

**BIOCONCENTRATION:** 1.15 (estimated from Kow)

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

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**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.

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**14. TRANSPORT INFORMATION**

**U.S. DOT 49 CFR 172.101:**
**PROPER SHIPPING NAME:** Butylene
**ID NUMBER:** UN1012
**HAZARD CLASS OR DIVISION:** 2.1
LABELING REQUIREMENTS: 2.1

QUANTITY LIMITATIONS:

PASSENGER AIRCRAFT OR RAILCAR: Forbidden
CARGO AIRCRAFT ONLY: 150 kg

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Butylene
UN NUMBER: UN1012
CLASS: 2.1

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: Yes


STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:

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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