

**WEISS INSTRUMENTS INC.  
 FILLS FOR VAPOR THERMOMETERS  
 CROSS INDEXED BY THERMOMETER RANGE**

<b>RANGE</b>	<b>THERMAL FILL</b>	<b>MSDS PAGE NO.</b>
<b>40-0-60 F (40-0-15 C)</b>	<b>PROPANE</b>	<b>35</b>
<b>40-0-110 F (40-0-43 C)</b>	<b>PROPANE</b>	<b>35</b>
<b>20-0-100 F (30-0-35 C)</b>	<b>PROPANE</b>	<b>35</b>
<b>0-150 F (15-0-65 C)</b>	<b>DIMETHYL ETHER</b>	<b>18</b>
<b>0-180 F (20-0-82 C)</b>	<b>ISOBUTANE</b>	<b>2</b>
<b>0-250 F (15-0-120 C)</b>	<b>BUTANE</b>	<b>7</b>
<b>0-300 F (20-0-150 C)</b>	<b>ETHYL CHLORIDE</b>	<b>23</b>
<b>20-220 F (7-0-105 C)</b>	<b>BUTANE</b>	<b>7</b>
<b>30-300 F (0-150 C)</b>	<b>ETHYL CHLORIDE</b>	<b>23</b>
<b>40-240 F (0-115 C)</b>	<b>ETHYL CHLORIDE</b>	<b>23</b>
<b>60-260 F (20-125 C)</b>	<b>ETHYL CHLORIDE</b>	<b>23</b>
<b>100-220 F (40-105 C)</b>	<b>ETHER</b>	<b>29</b>
<b>100-280 F (40-138 C)</b>	<b>ETHER</b>	<b>29</b>
<b>100-350 F (35-175 C)</b>	<b>ETHER</b>	<b>29</b>
<b>200-450 F (100-230 C)</b>	<b>CYCLOHEXANE</b>	<b>12</b>

Note: Volume of thermal fill per thermometer approximately 5cc (0.3 cu. in.), for system lengths to 6 feet. Add 1.0 cc (.06 cu. in.) for every 10 ft. additional length.

# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## **ISOBUTANE**

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**MATHESON TRI-GAS, INC.**  
**959 ROUTE 46 EAST**  
**PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:**  
**CHEMTREC 1-800-424-9300**  
**INFORMATION CONTACT:**  
**973-257-1100**

**SUBSTANCE: ISOBUTANE**

**TRADE NAMES/SYNONYMS:**

MTG MSDS 55; 2-METHYL PROPANE; TRIMETHYL METHANE; UN 1969; C4H10; MAT11600; RTECS TZ4300000

**CHEMICAL FAMILY:** hydrocarbons, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

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### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

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**COMPONENT:** ISOBUTANE      **CAS NUMBER:** 75-28-5      **PERCENTAGE:** 100.0

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### **SECTION 3 HAZARDS IDENTIFICATION**

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

**EMERGENCY OVERVIEW: COLOR:** colorless

**PHYSICAL FORM:** gas

**ODOR:** petroleum odor

**MAJOR HEALTH HAZARDS:** respiratory tract irritation, central nervous system depression, difficulty breathing

**PHYSICAL HAZARDS:** Flammable gas. May cause flash fire.

**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

**SHORT TERM EXPOSURE:** irritation, nausea, vomiting, headache, symptoms of drunkenness, suffocation, convulsions, coma

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

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** blisters, frostbite

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

**EYE CONTACT:**

**SHORT TERM EXPOSURE:** frostbite, blurred vision



**LONG TERM EXPOSURE:** no information is available

**INGESTION:**

**SHORT TERM EXPOSURE:** frostbite

**LONG TERM EXPOSURE:** no information is available

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#### **SECTION 4 FIRST AID MEASURES**

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**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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#### **SECTION 5 FIRE FIGHTING MEASURES**

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

**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 flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

**FLASH POINT:** -126 F (-88 C) (CC)

**LOWER FLAMMABLE LIMIT:** 1.8%

**UPPER FLAMMABLE LIMIT:** 8.4%

**AUTOIGNITION:** 860 F (460 C)

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#### **SECTION 6 ACCIDENTAL RELEASE MEASURES**

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**OCCUPATIONAL RELEASE:** Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

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## SECTION 7 HANDLING AND STORAGE

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**STORAGE:** Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.110. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

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## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

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**EXPOSURE LIMITS: ISOBUTANE:**

800 ppm (1900 mg/m<sup>3</sup>) NIOSH recommended TWA 10 hour(s)

**LIQUIFIED PETROLEUM GAS (LPG):**

1000 ppm (1800 mg/m<sup>3</sup>) OSHA TWA 1000 ppm ACGIH TWA 1000 ppm (1800 mg/m<sup>3</sup>) NIOSH recommended TWA 10 hour(s)

**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:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

**2000 ppm**

Any supplied-air respirator.

Any self-contained breathing apparatus with a full facepiece.

**Escape:** Any appropriate escape-type, self-contained breathing apparatus.

**For Unknown Concentrations or Immediately Dangerous to Life or Health**

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

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## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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**PHYSICAL STATE:** gas

**COLOR:** colorless

**ODOR:** petroleum odor

**MOLECULAR WEIGHT:** 58.12

**MOLECULAR FORMULA:** C<sub>4</sub>H<sub>10</sub>

**BOILING POINT:** 10 F (-12 C)

**FREEZING POINT:** -254 F (-159 C)

**VAPOR PRESSURE:** 3.1 atm @ 21 C

**VAPOR DENSITY (air=1):** 2.0

**SPECIFIC GRAVITY (water=1):** 0.549 @ 20 C

**WATER SOLUBILITY:** slightly soluble  
**PH:** Not applicable  
**VOLATILITY:** Not applicable  
**ODOR THRESHOLD:** Not available  
**EVAPORATION RATE:** Not applicable  
**VISCOSITY:** 0.0077 cP @ 25 C  
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable  
**SOLVENT SOLUBILITY: Soluble:** alcohol, ether, chloroform

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## **SECTION 10 STABILITY AND REACTIVITY**

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**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:** oxidizing materials  
**HAZARDOUS DECOMPOSITION:** Thermal decomposition products: oxides of carbon  
**POLYMERIZATION:** Will not polymerize.

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## **SECTION 11 TOXICOLOGICAL INFORMATION**

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**ISOBUTANE: TOXICITY DATA:** 57 pph/15 minute(s) inhalation-rat LC50  
**LOCAL EFFECTS:** Irritant: inhalation  
**ACUTE TOXICITY LEVEL:** Relatively Non-toxic: inhalation  
**TARGET ORGANS:** central nervous system  
**ADDITIONAL DATA:** Stimulants such as epinephrine may induce ventricular fibrillation.

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## **SECTION 12 ECOLOGICAL INFORMATION**

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Not available

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## **SECTION 13 DISPOSAL CONSIDERATIONS**

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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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## **SECTION 14 TRANSPORT INFORMATION**

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**U.S. DOT 49 CFR 172.101: PROPER SHIPPING NAME:** Isobutane see also Petroleum gases, liquefied  
**ID NUMBER:** UN1969  
**HAZARD CLASS OR DIVISION:** 2.1  
**LABELING REQUIREMENTS:** 2.1  
**CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME:** Isobutane  
**ID NUMBER:** UN1969  
**CLASSIFICATION:** 2.1



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## **SECTION 15 REGULATORY INFORMATION**

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**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 355.30):** Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):** Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):** ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: No SUDDEN RELEASE: Yes

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

### **STATE REGULATIONS:**

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION:** A, B1. **NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

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

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## **SECTION 16 OTHER INFORMATION**

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### **MSDS SUMMARY OF CHANGES**

SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## ***N-BUTANE***

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**MATHESON TRI-GAS, INC.  
959 ROUTE 46 EAST  
PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:  
CHEMTREC 1-800-424-9300  
INFORMATION CONTACT:  
973-257-1100**

**SUBSTANCE: N-BUTANE**

#### **TRADE NAMES/SYNONYMS:**

MTG MSDS 11; BUTANE; LIQUIFIED PETROLEUM GAS; NORMAL BUTANE; BUTYL HYDRIDE; LPG; UN 1011; C4H10; MAT15370; RTECS EJ4200000

**CHEMICAL FAMILY:** hydrocarbons, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

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### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

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**COMPONENT: N-BUTANE CAS NUMBER: 106-97-8 PERCENTAGE: 100.0**

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### **SECTION 3 HAZARDS IDENTIFICATION**

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

#### **EMERGENCY OVERVIEW:**

**COLOR:** colorless

**PHYSICAL FORM:** gas

**ODOR:** unpleasant odor

**MAJOR HEALTH HAZARDS:** central nervous system depression, difficulty breathing

**PHYSICAL HAZARDS:** Flammable gas. May cause flash fire.

#### **POTENTIAL HEALTH EFFECTS:**

##### **INHALATION:**

**SHORT TERM EXPOSURE:** irritation, nausea, vomiting, headache, drowsiness, symptoms of drunkenness, tingling sensation, suffocation, convulsions, coma.

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

##### **SKIN CONTACT:**

**SHORT TERM EXPOSURE:** blisters, frostbite

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

##### **EYE CONTACT:**

**SHORT TERM EXPOSURE:** frostbite, blurred vision

**LONG TERM EXPOSURE:** no information is available



**INGESTION:**

**SHORT TERM EXPOSURE:** frostbite

**LONG TERM EXPOSURE:** no information is available

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#### **SECTION 4 FIRST AID MEASURES**

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**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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#### **SECTION 5 FIRE FIGHTING MEASURES**

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

**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 flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

**FLASH POINT:** -76 F (-60 C) (CC)

**LOWER FLAMMABLE LIMIT:** 1.9%

**UPPER FLAMMABLE LIMIT:** 8.5%

**AUTOIGNITION:** 549 F (287 C)

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#### **SECTION 6 ACCIDENTAL RELEASE MEASURES**

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**OCCUPATIONAL RELEASE:**

Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

---

## SECTION 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 1910.110. Grounding and bonding required. Subject to storage regulations:

U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

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## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

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### **EXPOSURE LIMITS: N-BUTANE:**

800 ppm (1900 mg/m<sup>3</sup>) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)

800 ppm ACGIH TWA

800 ppm (1900 mg/m<sup>3</sup>) NIOSH recommended TWA 10 hour(s)

### **LIQUIFIED PETROLEUM GAS (LPG):**

1000 ppm (1800 mg/m<sup>3</sup>) OSHA TWA 1000 ppm ACGIH TWA 1000 ppm (1800 mg/m<sup>3</sup>) NIOSH recommended TWA 10 hour(s)

**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:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

### **2000 ppm**

Any supplied-air respirator.

Any self-contained breathing apparatus with a full face piece.

### **Escape**

Any appropriate escape-type, self-contained breathing apparatus.

### **For Unknown Concentrations or Immediately Dangerous to Life or Health**

Any supplied-air respirator with full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.

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## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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**PHYSICAL STATE:** gas

**COLOR:** colorless

**ODOR:** unpleasant odor

**MOLECULAR WEIGHT:** 58.12

**MOLECULAR FORMULA:** C-H<sub>3</sub>-(C-H<sub>2</sub>)<sub>2</sub>-C-H<sub>3</sub>

**BOILING POINT:** 30 F (-1 C)

**FREEZING POINT:** -216 F (-138 C)

**VAPOR PRESSURE:** 1557 mmHg @ 20 C  
**VAPOR DENSITY (air=1):** 2.1  
**SPECIFIC GRAVITY (water=1):** 0.5788 @ 0 C  
**WATER SOLUBILITY:** 15%  
**PH:** Not applicable  
**VOLATILITY:** Not applicable  
**ODOR THRESHOLD:** 6.16 ppm  
**EVAPORATION RATE:** Not applicable  
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable  
**SOLVENT SOLUBILITY: Soluble:** alcohol, ether, chloroform

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## **SECTION 10 STABILITY AND REACTIVITY**

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**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:** oxidizing materials  
**HAZARDOUS DECOMPOSITION:**  
Thermal decomposition products: oxides of carbon  
**POLYMERIZATION:** Will not polymerize.

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## **SECTION 11 TOXICOLOGICAL INFORMATION**

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**N-BUTANE: TOXICITY DATA:** 658 gm/m<sup>3</sup>/4 hour(s) inhalation-rat LC50  
**ACUTE TOXICITY LEVEL:** Relatively Non-toxic: inhalation  
**TARGET ORGANS:** central nervous system  
**ADDITIONAL DATA:** Stimulants such as epinephrine may induce ventricular fibrillation.

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## **SECTION 12 ECOLOGICAL INFORMATION**

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**FATE AND TRANSPORT:**  
**KOW:** 645.65 (log = 2.81) (estimated from water solubility)  
**KOC:** 979.49 (log = 2.99) (estimated from water solubility)  
**HENRY'S LAW CONSTANT:** 7.9 E -4 atm-m<sup>3</sup>/mol  
**BIOCONCENTRATION:** 0.74 (estimated from water solubility)  
**AQUATIC PROCESSES:** 2.0294118 hours (River Model: 1 m deep, 1 m/s flow, 3 m/s wind).  
**ENVIRONMENTAL SUMMARY:** Relatively non-persistent in the environment. Leaches through the soil or the sediment at a slow rate. Accumulates very little in the bodies of living organisms. Moderately volatile from water.

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## **SECTION 13 DISPOSAL CONSIDERATIONS**

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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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## SECTION 14 TRANSPORT INFORMATION

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**U.S. DOT 49 CFR 172.101: PROPER SHIPPING NAME:** Butane see also Petroleum gases, liquefied.

**ID NUMBER:** UN1011

**HAZARD CLASS OR DIVISION:** 2.1

**LABELING REQUIREMENTS:** 2.1

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME:**  
Butane

**ID NUMBER:** UN1011

**CLASSIFICATION:** 2.1

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## SECTION 15 REGULATORY INFORMATION

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**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 355.30):** Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):** Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):** ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: No SUDDEN RELEASE: Yes

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

**STATE REGULATIONS:**

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION:** A, B1. **NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

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

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## SECTION 16 OTHER INFORMATION

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### MSDS SUMMARY OF CHANGES

SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## **CYCLOHEXANE**

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**MATHESON TRI-GAS, INC.**  
**959 ROUTE 46 EAST**  
**PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:**  
**CHEMTREC 1-800-424-9300**  
**INFORMATION CONTACT:**  
**973-257-1100**

**SUBSTANCE: CYCLOHEXANE**

#### **TRADE NAMES/SYNONYMS:**

MTG MSDS 92; HEXAHYDROBENZENE; HEXAMETHYLENE; HEXANAPHTHENE;  
BENZENE HEXAHYDRIDE; RCRA U056; STCC 4908132; UN 1145; C6H12; MAT05870;  
RTECS GU6300000

**CHEMICAL FAMILY:** hydrocarbons, alicyclic

**CREATION DATE:** Nov

05 1993 **REVISION**

**DATE:** Dec 16 2002

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### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

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**COMPONENT: CYCLOHEXANE CAS NUMBER: 110-82-7 PERCENTAGE: 100.0**

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### **SECTION 3 HAZARDS IDENTIFICATION**

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**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:** respiratory tract irritation, skin irritation, aspiration hazard,  
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, dizziness, loss  
of coordination, coma

**LONG TERM EXPOSURE:** diarrhea

**SKIN CONTACT: SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** irritation

**EYE CONTACT: SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** irritation

**INGESTION: SHORT TERM EXPOSURE:** headache, drowsiness, dizziness, loss of



coordination, aspiration hazard

**LONG TERM EXPOSURE:** no information is available

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## **SECTION 4 FIRST AID MEASURES**

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**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:** Aspiration hazard. DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get immediate medical attention. Give artificial respiration if not breathing.

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## **SECTION 5 FIRE FIGHTING MEASURES**

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**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Moderate explosion 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. 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:** -4 F (-20 C) (CC)

**LOWER FLAMMABLE LIMIT:** 1.3%

**UPPER FLAMMABLE LIMIT:** 8.4%

**AUTOIGNITION:** 473 F (245 C)

**FLAMMABILITY CLASS (OSHA):**IB

---

## SECTION 6 ACCIDENTAL RELEASE MEASURES

---

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

**SOIL RELEASE:** Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers. Dike for later disposal. Absorb with sand or other non-combustible material. Collect with absorbent into suitable container.

**WATER RELEASE:** Cover with absorbent sheets, spill-control pads or pillows. Collect with absorbent into suitable container. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment.

**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. 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).

---

## SECTION 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.

---

## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

---

### EXPOSURE LIMITS: CYCLOHEXANE:

300 ppm (1050 mg/m<sup>3</sup>) OSHA TWA 100 ppm ACGIH TWA 300 ppm (1050 mg/m<sup>3</sup>) NIOSH recommended TWA 10 hour(s)

**VENTILATION:** 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. **1300 ppm**

Any supplied-air respirator operated in a continuous-flow mode.

Any powered, air-purifying respirator with organic vapor cartridge(s).

Any chemical cartridge respirator with a full face piece and organic vapor cartridge(s).

Any air-purifying respirator with a full face piece and an organic vapor canister.

Any self-contained breathing apparatus with a full face piece.

Any supplied-air respirator with a full face piece.

### Escape

Any air-purifying respirator with a full face piece and an 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 full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.

---

## **SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**

---

**PHYSICAL STATE:** liquid

**COLOR:** colorless

**ODOR:** faint odor, sweet odor

**MOLECULAR WEIGHT:** 84.18

**MOLECULAR FORMULA:** C-H<sub>2</sub>-(C-H<sub>2</sub>)<sub>4</sub>-C-H<sub>2</sub>

**BOILING POINT:** 178 F (81 C)

**FREEZING POINT:** 45 F (7 C)

**VAPOR PRESSURE:** 95 mmHg @ 20 C

**VAPOR DENSITY (air=1):** 2.90

**SPECIFIC GRAVITY (water=1):** 0.779

**WATER SOLUBILITY:** <0.01%

**PH:** Not available

**VOLATILITY:** 100%

**ODOR THRESHOLD:** 0.41 ppm

**EVAPORATION RATE:** Not available

**VISCOSITY:** 0.914 cP @ 22 C

**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available

**SOLVENT SOLUBILITY:** **Soluble:** methanol, ethanol, ether, acetone, benzene, ligroin, carbon tetrachloride

---

## **SECTION 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:** oxidizing materials, combustible materials

**HAZARDOUS DECOMPOSITION:**

Thermal decomposition products: oxides of carbon

**POLYMERIZATION:** Will not polymerize.

---

## **SECTION 11 TOXICOLOGICAL INFORMATION**

---

**CYCLOHEXANE: IRRITATION DATA:** 1548 mg/2 day(s)-intermittent skin-rabbit

**TOXICITY DATA:** 70 gm/m<sup>3</sup> inhalation-mammal LC<sub>50</sub>; 12705 mg/kg oral-rat LD<sub>50</sub>

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

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

**TARGET ORGANS:** central nervous system

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

**MUTAGENIC DATA:** Available

**ADDITIONAL DATA:** Alcohol may enhance the toxic effects.

---

## SECTION 12 ECOLOGICAL INFORMATION

---

### ECOTOXICITY DATA:

**FISH TOXICITY:** 4530 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimephales promelas)

**INVERTEBRATE TOXICITY:** 1420000 ug/L 96 hour(s) LC50 (Mortality) Marine bivalve (Katelaysia opima)

**ALGAL TOXICITY:** >160000 ug/L 48 hour(s) (Population Growth) Cryptomonad (Chilomonas paramecium)

---

## SECTION 13 DISPOSAL CONSIDERATIONS

---

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U056.  
Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.  
Dispose in accordance with all applicable regulations.

---

## SECTION 14 TRANSPORT INFORMATION

---

**U.S. DOT 49 CFR 172.101:PROPER SHIPPING NAME:** Cyclohexane

**ID NUMBER:** UN1145

**HAZARD CLASS OR DIVISION:** 3

**PACKING GROUP:** II

**LABELING REQUIREMENTS:** 3



**CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME:**  
Cyclohexane

**ID NUMBER:** UN1145      **CLASSIFICATION:** 3      **PACKING GROUP:** II

---

## SECTION 15 REGULATORY INFORMATION

---

**U.S. REGULATIONS:CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): CYCLOHEXANE:** 1000 LBS RQ

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):** Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):** Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):** ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: No SUDDEN RELEASE: No

**SARA TITLE III SECTION 313 (40 CFR 372.65): CYCLOHEXANE**

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

**STATE REGULATIONS:**

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION:** B

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

**TSCA 12(b) EXPORT NOTIFICATION: CYCLOHEXANE CAS NUMBER:** 110-82-7  
SECTION 4

**CANADA INVENTORY (DSL/NDSL):** Not determined.

---

## SECTION 16 OTHER INFORMATION

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### MSDS SUMMARY OF CHANGES

#### SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## ***DIMETHYL ETHER***

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**MATHESON TRI-GAS, INC.  
959 ROUTE 46 EAST  
PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:  
CHEMTREC 1-800-424-9300  
INFORMATION CONTACT:  
973-257-1100**

**SUBSTANCE: DIMETHYL ETHER**

**TRADFE NAMES/SYNONYMS:**

MTG MSDS 29; METHYL ETHER; WOOD ETHER; METHYL OXIDE;  
OXYBISMETHANE; METHYOXYMETHANE; UN 1033; MAT07720; RTECS PM4780000

**CHEMICAL FAMILY:** ethers, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

---

### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

---

**COMPONENT: DIMETHYL ETHER CAS NUMBER: 115-10-6 PERCENTAGE: 100.0**

---

### **SECTION 3 HAZARDS IDENTIFICATION**

---

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

**EMERGENCY OVERVIEW:**

**COLOR:** colorless

**PHYSICAL FORM:** gas

**ODOR:** sweet odor

**MAJOR HEALTH HAZARDS:** respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

**PHYSICAL HAZARDS:** Flammable gas. May cause flash fire. May form peroxides during prolonged storage.

**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

**SHORT TERM EXPOSURE:** irritation, difficulty breathing, headache, drowsiness, symptoms of drunkenness, blurred vision

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



**SKIN CONTACT:****SHORT TERM EXPOSURE:** irritation (possibly severe)**LONG TERM EXPOSURE:** no information is available**EYE CONTACT:****SHORT TERM EXPOSURE:** irritation (possibly severe)**LONG TERM EXPOSURE:** no information is available**INGESTION:****SHORT TERM EXPOSURE:** no information on significant adverse effects**LONG TERM EXPOSURE:** no information is available

---

**SECTION 4 FIRST AID MEASURES**

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**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:** 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.

---

**SECTION 5 FIRE FIGHTING MEASURES**

---

**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Vapor/air mixtures are explosive. Containers may rupture or explode if exposed to heat. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion. Severe explosion hazard.**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 flammables. Evacuation radius: 800 meters (1/2 mile).**FLASH POINT:** -42 F (-41 C) (CC)**LOWER FLAMMABLE LIMIT:** .4%**UPPER FLAMMABLE LIMIT:** 7.0%**AUTO IGNITION:** 662 F (350 C)

---

## SECTION 6 ACCIDENTAL RELEASE MEASURES

---

**OCCUPATIONAL RELEASE:** Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

---

## SECTION 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. Protect from physical damage. Store outside or in a detached building. Inside storage: Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition.

---

## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

---

**EXPOSURE LIMITS: DIMETHYL ETHER:**

1000 ppm AIHA recommended TWA

**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:** 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.

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 full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.

---

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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**NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

**CANADA INVENTORY (DSL/NDSL):** Not determined.

**PHYSICAL STATE:** gas

**COLOR:** colorless

**ODOR:** sweet odor

**MOLECULAR WEIGHT:** 46.08

**MOLECULAR FORMULA:** C<sub>2</sub>-H<sub>6</sub>-O  
**BOILING POINT:** -11 F (-24 C)  
**FREEZING POINT:** -224 F (-142 C)  
**VAPOR PRESSURE:** 3982 mmHg @ 20 C  
**VAPOR DENSITY (air=1):** 1.6  
**SPECIFIC GRAVITY (water=1):** 0.661  
**WATER SOLUBILITY:** 7.6%  
**PH:** Not applicable  
**VOLATILITY:** Not applicable  
**ODOR THRESHOLD:** Not available  
**EVAPORATION RATE:** Not applicable  
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable  
**SOLVENT SOLUBILITY:** **Soluble:** alcohol, ether, chloroform, acetone, organic solvents

---

### **SECTION 10 STABILITY AND REACTIVITY**

---

**REACTIVITY:** May form explosive peroxides. Avoid prolonged storage or contact with air, light or storage and use above room temperature.  
**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:** oxidizing materials, combustible materials  
**HAZARDOUS DECOMPOSITION:** Thermal decomposition products: miscellaneous decomposition products  
**POLYMERIZATION:** Will not polymerize.

---

### **SECTION 11 TOXICOLOGICAL INFORMATION**

---

**DIMETHYL ETHER: TOXICITY DATA:** 308 gm/m<sup>3</sup> inhalation-rat LC50  
**LOCAL EFFECTS:** Irritant: inhalation, skin, eye  
**ACUTE TOXICITY LEVEL:** Slightly Toxic: inhalation  
**TARGET ORGANS:** central nervous system  
**REPRODUCTIVE EFFECTS DATA:** Available.

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### **SECTION 12 ECOLOGICAL INFORMATION**

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Not available

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### **SECTION 13 DISPOSAL CONSIDERATIONS**

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Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.  
Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D003.  
Dispose in accordance with all applicable regulations.

---

### **SECTION 14 TRANSPORT INFORMATION**

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**U.S. DOT 49 CFR 172.101:PROPER SHIPPING NAME:** Dimethyl ether  
**ID NUMBER:** UN1033  
**HAZARD CLASS OR DIVISION:** 2.1  
**LABELING REQUIREMENTS:** 2.1  
**CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME:**  
Dimethyl ether  
**ID NUMBER:** UN1033  
**CLASSIFICATION:** 2.1



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**SECTION 15 REGULATORY INFORMATION**

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**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 355.30):**

FCNot regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):**

Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):**

ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: Yes SUDDEN RELEASE: Yes

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

Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):**

Not regulated.

**STATE REGULATIONS:**

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION: AB**

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**SECTION 16 OTHER INFORMATION**

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**MSDS SUMMARY OF CHANGES**

SECTION 11 TOXICOLOGICAL INFORMATION

SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## **ETHYL CHLORIDE**

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

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**MATHESON TRI-GAS, INC.  
959 ROUTE 46 EAST  
PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:  
CHEMTREC 1-800-424-9300  
INFORMATION CONTACT:  
973-257-1100**

**SUBSTANCE: ETHYL CHLORIDE**

#### **TRADE NAMES/SYNONYMS:**

MTG MSDS 32; CHLOROETHANE; MONOCHLOROETHANE; MURIATIC ETHER; KELENE; HYDROCHLORIC ETHER; ETHER HYDROCHLORIC; ETHER MURIATIC; NARCOTILE; AETHYLIS; CHELEN; CHLORETHYL; CHLORIDUM; CHLORYL; CHLORYL ANESTHETIC; ETHER CHLORATUS; STCC 4908162; UN 1037; C<sub>2</sub>H<sub>5</sub>CL; MAT08880; RTECS KH7525000

**CHEMICAL FAMILY:** halogenated, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

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### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

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**COMPONENT:** ETHYL CHLORIDE **CAS NUMBER:** 75-00-3 **PERCENTAGE:** 100.0

---

### **SECTION 3 HAZARDS IDENTIFICATION**

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

**EMERGENCY OVERVIEW:**

**PHYSICAL FORM:** gas

**MAJOR HEALTH HAZARDS:** eye irritation, central nervous system depression

**PHYSICAL HAZARDS:** Flammable gas. May cause flash fire.

**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

**SHORT TERM EXPOSURE:** irritation, nausea, vomiting, irregular heartbeat, headache, symptoms of drunkenness

**LONG TERM EXPOSURE:** disorientation, kidney damage, liver damage

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** irritation blisters

**LONG TERM EXPOSURE:** same as effects reported in short term exposure



**EYE CONTACT:****SHORT TERM EXPOSURE:** irritation, blurred vision**LONG TERM EXPOSURE:** same as effects reported in short term expos**INGESTION:****SHORT TERM EXPOSURE:** same as effects reported in other routes of exposure, sore throat, frostbite, headache**LONG TERM EXPOSURE:** no information is available

---

**SECTION 4 FIRST AID MEASURES**

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**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. 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:** Immediately 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.

---

**SECTION 5 FIRE FIGHTING MEASURES**

---

**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.**EXTINGUISHING MEDIA:** carbon dioxide, regular dry chemical, 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: 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 flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.**FLASH POINT:** -58 F (-50 C) (CC)**LOWER FLAMMABLE LIMIT:** 3.8%**UPPER FLAMMABLE LIMIT:** 15.4%**AUTOIGNITION:** 966 F (519 C)

---

## SECTION 6 ACCIDENTAL RELEASE MEASURES

---

**OCCUPATIONAL RELEASE:** Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personnel risk. Reduce vapors with water spray. Small spill; absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: dike for later disposal. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (.S. SARA Section 304). If release occurs in the U.S. and is reported under CERCLA Section 103, notify the National Response Center at (800)424-8802(USA) or (202)426-2675 (USA)

---

## SECTION 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 1910.101. Grounding and bonding required. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Store in a well ventilated area. Keep separated from incompatible substances.

---

## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

---

### **EXPOSURE LIMITS: ETHYL CHLORIDE:**

1000 ppm (2600 mg/m<sup>3</sup>) OSHA TWA

100 PPM ACGIH TWA (skin)

**VENTILATION:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. 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:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

### **3800 ppm**

Any supplied-air respirator.

Any self-contained breathing apparatus with a full facepiece.

**Escape:** Any air-purifying respirator with a full face piece and an 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 full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.

---

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

---

**PHYSICAL STATE:** gas

**ODOR:** Not Available

**MOLECULAR WEIGHT:** 64.52

**MOLECULAR FORMULA:** C2-H5-CL

**BOILING POINT:** 54 F (12 C)

**FREEZING POINT:** -213 F (-136 C)

**VAPOR PRESSURE:** 1000 mmHg @ 20 C

**VAPOR DENSITY (air=1):** 2.2

**SPECIFIC GRAVITY (water=1):** 0.9

**WATER SOLUBILITY:** 0.6%

**PH:** Not applicable

**VOLATILITY:** Not applicable

**ODOR THRESHOLD:** Not available

**EVAPORATION RATE:** Not applicable

**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable

**SOLVENT SOLUBILITY: Soluble:** alcohol, ether, chloroform

---

## SECTION 10 STABILITY AND REACTIVITY

---

**REACTIVITY:** Stable at normal temperatures and pressure. May react on contact with water. May release toxic and/or flammable gases.

**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:** metals, oxidizing materials

**HAZARDOUS DECOMPOSITION:** Thermal decomposition products: acid halides, phosgene

**POLYMERIZATION:** Will not polymerize.

---

## SECTION 11 TOXICOLOGICAL INFORMATION

---

**ETHYL CHLORIDE: TOXICITY DATA:** 152 gm/m<sup>3</sup>/2 hour(s) inhalation-rat LC50

**CARCINOGEN STATUS:** IARC: Human No Adequate Data, Animal Limited Evidence, Group 3; ACGIH: A3 –Animal Carcinogen

**LOCAL EFFECTS:** Irritant: eye

**ACUTE TOXICITY LEVEL:** Slightly-toxic: inhalation

**TARGET ORGANS:** central nervous system

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** heart or respiratory disorders, kidney disorders, liver disorders

**TUMORIGENIC DATA:** Available

**MUTAGENIC DATA:** Available

**REPRODUCTIVE EFFECTS DATA:** Available

**ADDITIONAL DATA:** May be excreted in breast milk. Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

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## SECTION 12 ECOLOGICAL INFORMATION

---

Not available

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## SECTION 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.

---

## SECTION 14 TRANSPORT INFORMATION

---

**U.S. DOT 49 CFR 172.101:PROPER SHIPPING NAME:** Ethyl chloride

**ID NUMBER:** UN1037

**HAZARD CLASS OR DIVISION:** 2.1

**LABELING REQUIREMENTS:** 2.1

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:**

**SHIPPING NAME:** Ethyl Chloride

**ID NUMBER:** UN1037

**CLASSIFICATION:** 2.1

---



## SECTION 15 REGULATORY INFORMATION

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### U.S. REGULATIONS:

**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):**

**Chloroethane (Ethyl chloride): 100 LBS RQ**

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):** Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):** Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):**

ACUTE: Yes

CHRONIC: No

FIRE: Yes

REACTIVE: Yes

SUDDEN RELEASE: No

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

**Chloroethane (Ethyl chloride).**

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

### STATE REGULATIONS:

**California Proposition 65:** Known to the state of California to cause the following:

**Chloroethane (Ethyl chloride) Cancer (July 01, 1990)**

### CANADIAN REGULATIONS:

**WHMIS CLASSIFICATION:** AB

### NATIONAL INVENTORY STATUS:

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:**

**CHLOROETHANE**

**CAS NUMBER:** 75-00-3

SECTION 4

**CANADA INVENTORY (DSL/NDSL):** Not determined.

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**SECTION 16      OTHER INFORMATION**

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**MSDS SUMMARY OF CHANGES**

SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## **ETHYL ETHER**

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### **SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

---

**MATHESON TRI-GAS, INC.**  
**959 ROUTE 46 EAST**  
**PARSIPPANY, NEW JERSEY 07054-0624**

**EMERGENCY CONTACT:**  
**CHEMTREC 1-800-424-9300**  
**INFORMATION CONTACT:**  
**973-257-1100**

**SUBSTANCE: ETHYL ETHER**

#### **TRADE NAMES/SYNONYMS:**

MTG MSDS 112; DIETHYL ETHER; ETHOXYETHANE; ETHER; ETHYL OXIDE; DIETHYL OXIDE; SURFURIC ETHER; RCRA U117; UN 1155; STCC 4908157; C4H10O; MAT08980; RTECS KI5775000

**CHEMICAL FAMILY:** ethers, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

---

### **SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS**

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**COMPONENT:** ETHYL ETHER **CAS NUMBER:** 60-29-7 **PERCENTAGE:** 100.0

---

### **SECTION 3 HAZARDS IDENTIFICATION**

---

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

#### **EMERGENCY OVERVIEW:**

**COLOR:** colorless

**PHYSICAL FORM:** volatile liquid

**ODOR:** sweet 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 form peroxides during prolonged storage.

#### **POTENTIAL HEALTH EFFECTS:**

##### **INHALATION:**

**SHORT TERM EXPOSURE:** irritation, nausea, vomiting, headache, drowsiness, symptoms of drunkenness.

**LONG TERM EXPOSURE:** same as effects reported in short term exposure

##### **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:** nausea, vomiting, drowsiness, symptoms of drunkenness

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

---

**SECTION 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.

---

**SECTION 5 FIRE FIGHTING MEASURES**

---

**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Severe explosion hazard. Electrostatic charges may be generated by flow, agitation, etc. Vapor/air mixtures are explosive. May form explosive peroxides. 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:** -49 F (-45 C) (CC)

**LOWER FLAMMABLE LIMIT:** 1.9%

**UPPER FLAMMABLE LIMIT:** 48%

**AUTO IGNITION:** 356 F (180 C)

**FLAMMABILITY CLASS (OSHA):** IA

---

## SECTION 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 noncombustible 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).

---

## SECTION 7 HANDLING AND STORAGE

---

**STORAGE:** Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Keep separated from incompatible substances. Avoid contact with light. Grounding and bonding required. Provide fire protection and spill control systems suitable for the hazards of the material. May form peroxides during prolonged storage. Keep separated from incompatible substances.

---

## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

---

### **EXPOSURE LIMITS: ETHYL ETHER:**

400 ppm (1200 mg/m<sup>3</sup>) OSHA TWA 500 ppm (1520 mg/m<sup>3</sup>) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 400 ppm ACGIH TWA 500 ppm ACGIH STEL

**VENTILATION:** 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.

### **1900 ppm**

Any chemical cartridge respirator with organic vapor cartridge(s).

Any air-purifying respirator with a full face piece and an organic vapor canister.

Any powered, air-purifying respirator with organic vapor cartridge(s).

Any supplied-air respirator.

Any self-contained breathing apparatus with a full face piece.

### **Escape**

Any air-purifying respirator with a full face piece and an 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 full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full face piece.

---

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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**PHYSICAL STATE:** liquid  
**COLOR:** colorless  
**PHYSICAL FORM:** volatile liquid  
**ODOR:** sweet odor  
**TASTE:** burning taste, sweet taste  
**MOLECULAR WEIGHT:** 74.12  
**MOLECULAR FORMULA:** C<sub>4</sub>-H<sub>10</sub>-O  
**BOILING POINT:** 95 F (35 C)  
**FREEZING POINT:** -189 F (-123 C)  
**VAPOR PRESSURE:** 442 mmHg @ 20 C  
**VAPOR DENSITY (air=1):** 2.6  
**SPECIFIC GRAVITY (water=1):** 0.7

**WATER SOLUBILITY:** 6.9%  
**PH:** Not available  
**VOLATILITY:** Not available  
**ODOR THRESHOLD:** 0.33 ppm  
**EVAPORATION RATE:** 37.5 (butyl acetate=1)  
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available  
**SOLVENT SOLUBILITY:** Soluble: alcohol, acetone, benzene, chloroform, naphtha

---

## SECTION 10 STABILITY AND REACTIVITY

---

**REACTIVITY:** May form explosive peroxides. Avoid prolonged storage or contact with air, light or storage and use above room temperature.

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

**INCOMPATIBILITIES:** peroxides, combustible materials, halogens, oxidizing materials, metal salts, acids, bases

**HAZARDOUS DECOMPOSITION:**

Thermal decomposition products: oxides of carbon

**POLYMERIZATION:** Will not polymerize.

---

## SECTION 11 TOXICOLOGICAL INFORMATION

---

**ETHYL ETHER: IRRITATION DATA:** 100 ppm eyes-human; 360 mg open skin-rabbit mild; 100 mg eyes-rabbit moderate; 50 mg/24 hour(s) skin-guinea pig severe

**TOXICITY DATA:** 31000 ppm/30 minute(s) inhalation-mouse LC50; >20 ml/kg skin-rabbit LD50; 1215 mg/kg oral-rat LD50

**CARCINOGEN STATUS:** IARC: Human Inadequate Evidence, Group 3

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

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

**TARGET ORGANS:** central nervous system

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

**MUTAGENIC DATA:** Available.

**ADDITIONAL DATA:** Alcohol may enhance the toxic effects.

---

## SECTION 12 ECOLOGICAL INFORMATION

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### ECOTOXICITY DATA:

**FISH TOXICITY:** >10000000 ug/L 96 hour(s) LC50 (Mortality) Bluegill (Lepomis macrochirus)

### FATE AND TRANSPORT:

**BIOCONCENTRATION:** 61 ug/L 6 hour(s) BCF (Residue) Water flea (Daphnia magna) 0.8 ug/L

---

## SECTION 13 DISPOSAL CONSIDERATIONS

---

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U117. Dispose in accordance with all applicable regulations.

---

## SECTION 14 TRANSPORT INFORMATION

---

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

**PROPER SHIPPING NAME:** Diethyl ether or Ethyl ether

**ID NUMBER:** UN1155

**HAZARD CLASS OR DIVISION:** 3

**PACKING GROUP:** I

**LABELING REQUIREMENTS:** 3

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:**

**SHIPPING NAME:** Ethyl ether

**ID NUMBER:** UN1155

**CLASSIFICATION:** 3

**PACKING GROUP:** I



---

## SECTION 15 REGULATORY INFORMATION

---

### U.S. REGULATIONS:

**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):** ETHYL ETHER: 100 LBS RQ

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):** Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):** Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):** ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: Yes SUDDEN RELEASE: No

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

### STATE REGULATIONS:

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION:** B

### NATIONAL INVENTORY STATUS:

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

**CANADA INVENTORY (DSL/NDSL):** Not determined.

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## SECTION 16      OTHER INFORMATION

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### **MSDS SUMMARY OF CHANGES**

#### SECTION 15 REGULATORY INFORMATION

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# MATERIAL SAFETY DATA SHEET

Weiss Instruments Inc.

## PROPANE

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### SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

---

MATHESON TRI-GAS, INC.  
959 ROUTE 46 EAST  
PARSIPPANY, NEW JERSEY 07054-0624

EMERGENCY CONTACT:  
CHEMTREC 1-800-424-9300  
INFORMATION CONTACT:  
973-257-1100

**SUBSTANCE: PROPANE**

#### TRADE NAMES/SYNONYMS:

MTG MSDS 76; N-PROPANE; DIMETHYLMETHANE; PROPYL HYDRIDE; R-290; PROPYLHYDRIDE; LIQUEFIED PETROLEUM GAS; LPG; >96% NATURAL GRADE; >99.9% PURE GRADE; UN 1978; C3H8; MAT19690; RTECS TX2275000

**CHEMICAL FAMILY:** hydrocarbons, aliphatic

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 16 2002

---

### SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

---

**COMPONENT:** PROPANE **CAS NUMBER:** 74-98-6 **PERCENTAGE:** >96

---

### SECTION 3 HAZARDS IDENTIFICATION

---

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

**EMERGENCY OVERVIEW: COLOR:** colorless

**PHYSICAL FORM:** gas

**ODOR:** gasoline odor



**MAJOR HEALTH HAZARDS:** central nervous system depression, difficulty breathing

**PHYSICAL HAZARDS:** Flammable gas. May cause a flash fire.

#### POTENTIAL HEALTH EFFECTS:

##### INHALATION:

**SHORT TERM EXPOSURE:** nausea, vomiting, irregular heartbeat, headache, symptoms of drunkenness, disorientation, suffocation, convulsions, coma

**LONG TERM EXPOSURE:** same as effects reported in short term exposure

##### SKIN CONTACT:

**SHORT TERM EXPOSURE:** blisters, frostbite

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

##### EYE CONTACT:

**SHORT TERM EXPOSURE:** frostbite, blurred vision

**LONG TERM EXPOSURE:** no information is available

**INGESTION:**

**SHORT TERM EXPOSURE:** frostbite

**LONG TERM EXPOSURE:** no information is available

---

#### **SECTION 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.

---

#### **SECTION 5 FIRE FIGHTING MEASURES**

---

**FIRE AND EXPLOSION HAZARDS:** Severe fire hazard. Severe explosion hazard. Gas/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. 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 flammables. Evacuation radius: 800 meters (1/2 mile). Stop flow of gas.

**FLASH POINT:** -157 F (-105 C)

**LOWER FLAMMABLE LIMIT:** 2.1%

**UPPER FLAMMABLE LIMIT:** 9.5%

**AUTO IGNITION:** 842 F (450 C)

---

#### **SECTION 6 ACCIDENTAL RELEASE MEASURES**

---

**OCCUPATIONAL RELEASE:** Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

---

## SECTION 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 1910.110. Grounding and bonding required. Subject to storage regulations:

U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

---

## SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

---

**EXPOSURE LIMITS: PROPANE:**

1000 ppm (1800 mg/m<sup>3</sup>) OSHA TWA 2500 ppm ACGIH TWA 1000 ppm (1800 mg/m<sup>3</sup>)  
NIOSH recommended TWA 10 hour(s)

**LIQUIFIED PETROLEUM GAS (LPG):**

1000 ppm (1800 mg/m<sup>3</sup>) OSHA TWA 1000 ppm ACGIH TWA 1000 ppm (1800 mg/m<sup>3</sup>)  
NIOSH recommended TWA 10 hour(s)

**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:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

**2100 ppm**

Any supplied-air respirator.

Any self-contained breathing apparatus with a full facepiece.

**Escape**

Any appropriate escape-type, self-contained breathing apparatus.

**For Unknown Concentrations or Immediately Dangerous to Life or Health**

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

---

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

---

**PHYSICAL STATE:** gas

**COLOR:** colorless

**ODOR:** gasoline odor

**MOLECULAR WEIGHT:** 44.11

**MOLECULAR FORMULA:** C-H<sub>3</sub>-C-H<sub>2</sub>-C-H<sub>3</sub>

**BOILING POINT:** -40 F (-40 C)

**FREEZING POINT:** -310 F (-190 C)

**VAPOR PRESSURE:** 6398 mmHg @ 21.1 C

**VAPOR DENSITY (air=1):** 1.55

**SPECIFIC GRAVITY (water=1):** 0.5853 @ -45 C

**WATER SOLUBILITY:** very slightly soluble

**PH:** Not applicable

**VOLATILITY:** Not applicable

**ODOR THRESHOLD:** 5000-20000 ppm

**EVAPORATION RATE:** Not applicable

**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable

**SOLVENT SOLUBILITY: Soluble:** absolute alcohol, ether, chloroform, benzene, turpentine

---

## SECTION 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:** Oxidizing materials, combustible materials

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

**POLYMERIZATION:** Will not polymerize.

---

## SECTION 11 TOXICOLOGICAL INFORMATION

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**PROPANE:**

**TARGET ORGANS:** central nervous system

**ADDITIONAL DATA:** Stimulants such as epinephrine may induce ventricular fibrillation.

---

## SECTION 12 ECOLOGICAL INFORMATION

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Not available

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## SECTION 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.

---

## SECTION 14 TRANSPORT INFORMATION

---

**U.S. DOT 49 CFR 172.101:PROPER SHIPPING NAME:** Propane see also Petroleum gases, liquefied.

**ID NUMBER:** UN1978

**HAZARD CLASS OR DIVISION:** 2.1

**LABELING REQUIREMENTS:** 2.1

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME:**

Propane **ID NUMBER:** UN1978

**CLASSIFICATION:** 2.1



---

## SECTION 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 355.30):**

Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):**

Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):**

ACUTE: Yes CHRONIC: No FIRE: Yes REACTIVE: No SUDDEN RELEASE: Yes

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

**STATE REGULATIONS:**

**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS: WHMIS CLASSIFICATION:** A, B1.

**NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed. **CANADA INVENTORY**

**(DSL/NDSL):** Listed on inventory.

---

## **SECTION 16      OTHER INFORMATION**

---

### **MSDS SUMMARY OF CHANGES**

SECTION 1 CHEMICAL PRODUCT AND COMPANY

IDENTIFICATION SECTION 2 COMPOSITION,

INFORMATION ON INGREDIENTS SECTION 15

REGULATORY INFORMATION

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