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: N-BUTYRALDEHYDE

TRADE NAMES/SYNONYMS:
MTG MSDS 230; BUTAL; BUTALDEHYDE; BUTALYDE; BUTANAL; BUTYRAL; N-BUTYL ALDEHYDE; BUTYRALDEHYDE; BUTANALDEHYDE; BUTYL ALDEHYDE; BUTYRIC ALDEHYDE; UN 1129; O-1711; C4H8O; MAT15520; RTECS ES2275000

CHEMICAL FAMILY: aldehydes, aliphatic

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

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: N-BUTYRALDEHYDE
CAS NUMBER: 123-72-8
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: distinct odor
MAJOR HEALTH HAZARDS: respiratory tract burns, skin burns, eye burns, mucous membrane burns, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

INHALATION:
SHORT TERM EXPOSURE: burns, nausea, vomiting, difficulty breathing, headache, symptoms of drunkenness, lung congestion
LONG TERM EXPOSURE: same as effects reported in short term exposure

SKIN CONTACT:
SHORT TERM EXPOSURE: burns, absorption may occur
LONG TERM EXPOSURE: same as effects reported in short term exposure

EYE CONTACT:
SHORT TERM EXPOSURE: burns
LONG TERM EXPOSURE: same as effects reported in short term exposure

INGESTION:
SHORT TERM EXPOSURE: burns, nausea, vomiting, diarrhea, stomach pain, headache, symptoms of drunkenness
LONG TERM EXPOSURE: same as effects reported in short term exposure

4. FIRST AID MEASURES

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

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing before reuse. Destroy contaminated shoes.

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. Avoid gastric lavage or emesis.

5. FIRE FIGHTING MEASURES

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

EXTINGUISHING MEDIA: alcohol-resistant foam, carbon dioxide, regular dry chemical, water

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). 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:** -8 F (-22 C) (CC)
**LOWER FLAMMABLE LIMIT:** 1.9%
**UPPER FLAMMABLE LIMIT:** 12.5%
**AUTOIGNITION:** 424 F (218 C)
**FLAMMABILITY CLASS (OSHA):** IB

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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. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Bulk storage: Store under an inert atmosphere. Keep separated from incompatible substances. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE LIMITS:**
**N-BUTYRALDEHYDE:**
25 ppm AIHA WEEL TWA

**VENTILATION:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).
- Any air-purifying respirator with a full facepiece and an organic vapor canister.

For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
APPEARANCE: clear
COLOR: colorless
ODOR: distinct odor
TASTE: pungent taste
MOLECULAR WEIGHT: 72.12
MOLECULAR FORMULA: C4-H8-O
BOILING POINT: 167-169 F (75-76 C)
FREEZING POINT: -141 F (-96 C)
VAPOR PRESSURE: 91.5 mmHg @ 20 C
VAPOR DENSITY (air=1): 2.5
SPECIFIC GRAVITY (water=1): 0.817
WATER SOLUBILITY: 7%
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, acetone, benzene, toluene

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.
CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: oxidizing materials, acids, bases

HAZARDOUS DECOMPOSITION: Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

N-BUTYRALDEHYDE:
IRRITATION DATA: 410 mg open skin-rabbit mild; 20 mg/24 hour(s) eyes-rabbit moderate
TOXICITY DATA: 6400 ppm/4 hour(s) inhalation-rat LC50; 3560 ul/kg skin-rabbit LD50; 2490 mg/kg oral-rat LD50
LOCAL EFFECTS: Corrosive: inhalation, skin, eye, ingestion
ACUTE TOXICITY LEVEL: Moderately Toxic: ingestion
Slightly Toxic: inhalation, dermal absorption
TARGET ORGANS: central nervous system
MUTAGENIC DATA: Available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: 16000 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimephales promelas)

INVERTEBRATE TOXICITY: 383 mg/L 24 hour(s) EC100 (Abundance) Water flea (Daphnia magna)

ALGAL TOXICITY: 44000 ug/L 48 hour(s) (Population Growth) Cryptomonad (Chilomonas paramecium)

FATE AND TRANSPORT:
KOW: 1318.26 (log = 3.12) (estimated from water solubility)

KOC: 1492.79 (log = 3.18) (estimated from water solubility)

HENRY'S LAW CONSTANT: 1.2 E -4 atm-m3/mol

BIOCONCENTRATION: 1.13 (estimated from water solubility)

AQUATIC PROCESSES: 2.2030748 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.

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Butyraldehyde
ID NUMBER: UN1129
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Butyraldehyde
UN NUMBER: UN1129
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
SARA TITLE III SECTION 313 (40 CFR 372.65):  
N-BUTYRALDEHYDE


**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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