1. Material Safety Data Sheet

2-METHOXYETHANOL

1. Product Identification

Synonyms: Ethylene glycol monomethyl ether; methyl
celllosolve(R); methoxyhydroxyethane

CAS No: 109-86-4

Molecular Weight: 76.09

Chemical Formula: CH3OC2H4OH
2. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS No</th>
<th>Percent</th>
<th>Hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methoxyethanol</td>
<td>109-86-4</td>
<td>100%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. MAY FORM EXPLOSIVE PEROXIDES IN AIR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, BLOOD AND BLOOD FORMING ORGANS, REPRODUCTIVE SYSTEM AND KIDNEYS. POSSIBLE BIRTH DEFECT HAZARD. MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 2 - Moderate
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD;
PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may cause irritation, headache, dizziness, fatigue, nausea, vomiting, and loss of appetite. Weakness, incoordination and tremors may occur.

Ingestion:
Moderately toxic. Can cause headache, fatigue, nausea, vomiting, dizziness, and weakness. Hemorrhagic gastritis, liver damage, pancreas damage and brain edema resulting in death has occurred in human exposure of 3 g/kg. Damage to kidneys is possible from ingestion of large quantities.

Skin Contact:
May cause irritation with redness and pain. May be absorbed through the skin with possible systemic effects.

Eye Contact:
May cause irritation, redness and pain.

Chronic Exposure:
Prolonged exposure may cause injury to bone marrow, blood cells, kidney, liver and testes. A suspected human reproductive hazard and a birth defect hazard. Severe neurological disabilities has been reported from chronic industrial exposure. Symptoms have included headache, dizziness, lethargy, weakness, personality changes, apathy, unequal pupil size, and disorientation.

Aggravation of Pre-existing Conditions:
Persons with pre-existing blood or central nervous system disorders may...
be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 39°C (102°F)
Autoignition temperature: 286°C (547°F)
Flammable limits in air % by volume:
lel: 1.8; uel: 14
Flammable.

Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Vapors can flow along surfaces to distant ignition source and flash back. Sensivel a descargas estáticas.

Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to
stop leak, and to flush spills away from exposures.
J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of
this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated
location, away from any area where the fire hazard may be acute. Outside
or detached storage is preferred. Separate from incompatibles. Containers
should be bonded and grounded for transfers to avoid static sparks.
Storage and use areas should be No Smoking areas. Use non-sparking type
tools and equipment, including explosion proof ventilation. Be aware of
possible peroxide formation. Avoid use of aluminum and magnesium
equipment. Containers of this material may be hazardous when empty since
they return product residues (vapors, liquid); observe all warnings and
precautions listed for the product. Sudden release of hot organic
chemical vapors or mists from process equipment operating at elevated
temperatures and pressure, or sudden ingress of air into vacuum
equipment, may result in ignitions without the presence of ignition
sources. Published "autoignition" or "ignition" temperature values cannot
be treated as safe operating temperatures in chemical processes without
analysis of the actual process conditions.

8. Exposure Controls PERSONAL PROTECTION

Airborne Exposure Limits:
2-Methoxyethanol (EGME):
-OSHA Permissible Exposure Limit (PEL):
25 ppm (TWA) skin, Methyl Cellosolve
-ACGIH Threshold Limit Value (TLV):
0.1 ppm (TWA) skin

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee
exposures below the Airborne Exposure Limits. Local exhaust ventilation
is generally preferred because it can control the emissions of the
contaminant at its source, preventing dispersion of it into the general
work area. Please refer to the ACGIH document, "Industrial Ventilation, A
Manual of Recommended Practices", most recent edition, for details.

Personal Respirators (NIOSH Approved): If the exposure limit is exceeded and engineering controls are not
feasible, a half-face organic vapor respirator may be worn for up to ten
times the exposure limit, or the maximum use concentration specified by
the appropriate regulatory agency or respirator supplier, whichever is
lowest. A full-face piece organic vapor respirator may be worn up to 50
times the exposure limit, or the maximum use concentration specified by
the appropriate regulatory agency or respirator supplier, whichever is
lowest. For emergencies or instances where the exposure levels are not
known, use a full-face piece positive-pressure, air-supplied respirator.
WARNING: Air-purifying respirators do not protect workers in
oxygen-deficient atmospheres.

Skin Protection:
Rubber or neoprene gloves and additional protection including impervious
boots, apron, or coveralls, as needed in areas of unusual exposure.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench
facilities in work area.
9. Physical and Chemical Properties

Appearance: Clear, colorless liquid.
Odor: Pleasant odor.
Solubility: Miscible in water.
Specific Gravity: 0.96 @ 20C/4C
pH: No information found.
% Volatiles by volume @ 21C (70F): 100

Boiling Point: 124C (255F)
Melting Point: -85.1C (-121F)
Vapor Density (Air=1): 2.62
Vapor Pressure (mm Hg): 6.2 @ 20C (68F)
Evaporation Rate (BuAc=1): ca. 1

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Formation of explosive peroxides has been reported from auto-oxidation. Reported to dissolve aluminum from scratched or heated aluminum surfaces. Do not distill to dryness. Avoid excessive temperatures or prolonged reflux, such as in batch distillations.

Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Strong oxidizers and alkalis, strong acids, high temperatures in the presence of strong bases. Contact with excessive heat, open flame, sparks, or ignition sources.

Conditions to Avoid:
Heat, flame, ignition sources, air, incompatibles

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 2370 mg/kg; inhalation rat LC50: 1500 ppm/7H; skin rabbit LD50: 1280 mg/kg.

Reproductive Toxicity:
In laboratory animals, this compound has caused both birth defects and damage to the reproductive system.

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Ingredient
2-Methoxyethanol (109-86-4)

---NTP Carcinogen---
Known Anticipated IARC Category
No No None
12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.

Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l. This material is not expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.

Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: ETHYLENE GLYCOL MONOMETHYL ETHER
Hazard Class: 3
UN/NA: UN1188 Packing Group: III
Information reported for product/size: 4L

International (Water, I.M.O.)

Proper Shipping Name: ETHYLENE GLYCOL MONOMETHYL ETHER
Hazard Class: 3
UN/NA: UN1188 Packing Group: III
Information reported for product/size: 4L

International (Air, I.C.A.O.)

Proper Shipping Name: ETHYLENE GLYCOL MONOMETHYL ETHER
Hazard Class: 3
UN/NA: UN1188 Packing Group: III
Information reported for product/size: 4L

15. Regulatory Information
Ingredient: 2-Methoxyethanol (109-86-4)

<table>
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Chemical Inventory Status - Part 2

Ingredient: 2-Methoxyethanol (109-86-4)

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Federal, State & International Regulations - Part 1

Ingredient: 2-Methoxyethanol (109-86-4)

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Federal, State & International Regulations - Part 2

Ingredient: 2-Methoxyethanol (109-86-4)

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<tbody>
<tr>
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Chemical Weapons Convention: No

TSCA 12(b): No

CDSA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No

Reactivity: Yes (Pure / Liquid)

Prop 65: THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 2[S]

Australian Poison Schedule: None allocated.

WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings:
Health: 2 Flammability: 2 Reactivity: 2

Label Hazard Warning:
WARNING! FLAMMABLE LIQUID AND VAPOR. MAY FORM EXPLOSIVE PEROXIDES IN AIR. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, BLOOD AND BLOOD FORMING ORGANS, REPRODUCTIVE SYSTEM AND KIDNEYS. POSSIBLE BIRTH DEFECT HAZARD. MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.

Label Precautions:
Avoid breathing vapor or mist.
Avoid contact with eyes, skin and clothing.
Keep away from heat, sparks and flame.
Keep container closed.
Wash thoroughly after handling.
Use only with adequate ventilation.

Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact,
immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:
Laboratory Reagent.

Revision Information:
MSDS Section(s) changed since last revision of document include: 8.

Disclaimer:
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