MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT

MSDS Name: Diethylene Glycol Monobutyl Ether
Synonyms: Butyl Carbitol, Glycol Ether DB, Butyl Di Glycol
For CHEMTREC assistance, call: 800-424-9300

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS#: 112-34-5
Chemical Name: Diethylene glycol monobutyl ether
EINECS#: 203-961-6
Hazard Symbols: XI
Risk Phrases: 36

SECTION 3 - HAZARDS IDENTIFICATION

Health Hazards: Irritating to Eyes
Safety Hazard: Not classified as FLAMMABLE, but will burn

HEALTH HAZARD:

Skin Contact: May cause moderate irritation to skin. Repeated exposure may cause skin dryness or cracking.
Eye Contact: Irritating to eyes
Signs and Symptoms: Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.
Aggravated Medical Condition: Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin Eyes

SECTION 4 - FIRST AID MEASURES

General Information: In general no treatment is needed, however obtain medical advise.

Inhalation: Remove to fresh air.

Skin Contact: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

Ingestion: If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
Advice to Physician: Consult a Poison Control Center for guidance.

SECTION 5 - FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash Point: 105ºC (221ºF)

Explosion/Flammability (Limits in Air): 0.9 – 5.9 % (V)

Auto Ignition Temperature: 225ºC (437ºF)

Specific Hazards: Carbon monoxide may be evolved if incomplete combustion occurs. The vapor is heavier than air, spreads along the ground and distant ignition possible.

Extinguishing Media: Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.

Unsuitable Extinguishing Media: Do not use water in a jet.

Protective Equipment for Firefighters: Wear all protective clothing and self-contained breathing apparatus.

Additional Advise: Keep adjacent containers cool by spraying with water.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective Measures: Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Section 8 of this MSDS. For guidance on disposal of spilled material see Section 13 of this MSDS. Shut off leaks, if possible, without personal risk. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using, sand, earth, or other appropriate barriers. Attempt to disperse the vapor or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grouping (earthing) all equipment. Monitor area with combustible gas indicator.

Clean Up Methods: For large spills (> 1 drum), transfer by mechanical means, such as vacuum truck, to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of it safely.

Additional Advise:
See Section 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.

SECTION 7 - HANDLING and STORAGE

General Precautions: Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of the MSDS. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling: Handling temperature: AMBIENT

Storage: Must be kept inhibited during storage and shipment as material can polymerize. Storage temperature: AMBIENT

Product Transfer: Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.

Recommended Materials: For containers, or container linings use mild steel, or stainless steel.

Container Advise: Containers, even those that have been emptied, can still contain explosive vapors. Do not cut, drill, grind, weld, or perform similar operations on or near containers.

Additional Information: Glycol Ethers can be peroxide formers.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

Occupational Exposure Limits
None Established.

Additional Information: Wash hands before eating, drinking, smoking and using toilet.

Exposure Controls: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.
Personal Protective Equipment: Personal protective equipment (PPE) should meet recommended national standards. Check with PPE supplier.

Respiratory Protection: If engineering controls do not maintain airborne concentrations to a level which is adequate to protect workers' health, selected respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapors [boiling point > 65°C (149°F)] meeting EN141. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.

Hand Protection: Longer term protection: PVC. Nitrile rubber. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, and dexterity. Always seek advice from glove supplier. Contaminated gloves should be replaced.

Eye Protection: Chemical splash goggles (chemical mono-goggles).

Protective Clothing: Use protective clothing which is chemical resistant to this material. Safety shoes and boots should also be chemical resistant.

Environmental Exposure Controls: Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapor.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>Appearance: Clear liquid</td>
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<tr>
<td>Odor: Ethereal</td>
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<tr>
<td>Boiling Point: Typical 225 – 234 °C / 437 – 453 °F</td>
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<tr>
<td>Flash Point: 105 °C / 221 °F (Abel)</td>
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<tr>
<td>Explosion/Flammability (limits in air): 0.9 – 5.9 % (V)</td>
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<tr>
<td>Auto-Ignition Temperature: 225 °C / 437 °F (ASTM D-2155)</td>
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<tr>
<td>Vapor Pressure: 5.5 Pa @ 20 °C / 68 °F</td>
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<tr>
<td>Specific Gravity: 0.95 – 0.96 @ 20 °C / 68 °F</td>
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<tr>
<td>Water Solubility: @ 20 °C / 68 °F Completely miscible.</td>
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<tr>
<td>Volatile Organic Carbon Content: 100 %</td>
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<tr>
<td>Evaporation Rate (nBuAc=1): 0.01 (ASTM D 3539, nBuAc=1)</td>
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SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable under normal conditions of use. Reacts with strong oxidizing agents.

Conditions to Avoid: High Temperatures. Avoid heat, sparks, open flames, and other ignition sources.

Hazardous Decomposition Products: Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids, and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

Hazardous Reactions: Hydroscopic.

SECTION 11 - TOXICOLOGICAL INFORMATION

Basis for Assessment: Information given is based on product testing.
Acute Oral Toxicity: Low toxicity: LD₅₀ > 2000 mg/kg, rat
Acute Dermal Toxicity: Low toxicity: LD₅₀ > 2000 mg/kg, rabbit
Acute Inhalation Toxicity: Low toxicity: LC₅₀ greater than near-saturated vapor concentration/1 hr rat.
Skin Irritation: Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.
Eye Irritation: Irritant.
Sensitization: not a skin sensitizer.
Repeated Dose Toxicity: Blood; causes haemolysis of red blood cells and/or anemia in animals, but not considered relevant for man.
Mutagenicity: Not mutagenic.

SECTION 12 - ECOLOGICAL INFORMATION

Acute Toxicity:
Fish: Low toxicity: LC/EC/IC₅₀ > 1000 mg/l
Aquatic Invertebrates: Low toxicity: LC/EC/IC₅₀ > 1000 mg/l
Algae: Expected to have low toxicity: LC/EC/IC₅₀ > 100 mg/l
Microorganisms: Low toxicity: LC/EC/IC₅₀ > 100 mg/l
Mobility: Dissolves in water
Bioaccumulation: Not expected to bioaccumulate significantly.

SECTION 13 - DISPOSAL CONSIDERATIONS

Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Container Disposal: Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld un-cleaned drums. Send to drum recover or metal re-claimer.
Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.
SECTION 14 - TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)

This material is not subject to DOT regulations under 49 CFR parts 171 – 180.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is not classified as dangerous under IATA regulations.

SECTION 15 - REGULATORY INFORMATION

US FEDERAL
TSCA
CAS# 112-34-5 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
CAS# 112-34-5: Testing required by: manufacturers; importers; processo
Section 12b
CAS# 112-34-5: 4/12b
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA
Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 112-34-5: acute, chronic, reactive.
Section 313
This material contains Diethylene glycol monobutyl ether (listed as ** undefined **), 100.0%, (CAS# 112-34-5) which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.
Clean Air Act:
CAS# 112-34-5 listed as ** no name ** is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depleters.
This material does not contain any Class 2 Ozone depleters.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
Diethylene glycol monobutyl et can be found on the following state right to know lists: Pennsylvania, (listed as ** no name **).
California No Significant Risk Level:
None of the chemicals in this product are listed.
European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XI
Risk Phrases:
R 36 Irritating to eyes.
Safety Phrases:
S 24 Avoid contact with skin.
S 26 In case of contact with eyes, rinse immediately
with plenty of water and seek medical advice.
WGK (Water Danger/Protection)
CAS# 112-34-5: 1
United Kingdom Occupational Exposure Limits

Canada
CAS# 112-34-5 is listed on Canada's DSL List.
This product has a WHMIS classification of B3, D2B.
CAS# 112-34-5 is listed on Canada's Ingredient Disclosure List.
Exposure Limits
CAS# 112-34-5: Not available.

SECTION 16 - ADDITIONAL INFORMATION

ALWAYS COMPLY WITH ALL APPLICABLE INTERNATIONAL, FEDERAL, STATE AND LOCAL REGULATIONS REGARDING THE TRANSPORTATION, STORAGE, USE AND DISPOSAL OF THIS CHEMICAL.

Due to the changing nature of regulatory requirements, the information in this document should NOT be considered all-inclusive or authoritative. Users should make their own investigations to determine the suitability of the information for their particular purposes. International, Federal, State and Local regulations should be consulted to determine compliance with all required reporting requirements.

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