
	KHARG MEG PLANT	
	Material Safety Data Sheet	
Contractor Job No. : HC3700		Rev. No. : B
Contractor Doc No. : 010AS4201		



Shell Chemicals

Diethylene Glycol
Version 1.4

Effective Date 10.07.2003

according to EC directive 2001/58/EC

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name	: Diethylene Glycol
Uses	: Chemical intermediate. Advice in this document relates only to product as originally supplied. Other derivative chemicals will have different properties and hazards. Advice should be sought on their safe handling and use.
Product Code	: U1237
Manufacturer/Supplier	: Shell Chemicals Europe B.V. PO Box 8610 3009 AP Rotterdam Netherlands
Telephone	: +31 (0)10 231 7000
Fax	: +31 (0)10 231 7180
Emergency Telephone Number	: +31 (0)10 431 3233

2. COMPOSITION/INFORMATION ON INGREDIENTS




Material Formal Name	: 2,2'-Oxydiethanol
Synonyms	: Diglycol DEG bis (2-hydroxyethyl) ether Digol Ethylene diglycol 2,2 Dihydroxy diethyl ether
CAS No.	: 111-46-6
INDEX No.	: 603-140-00-6
EINECS No.	: 203-872-2

Hazardous Components

Chemical Name	CAS	EINECS	Symbol(s)	R-phrases	Conc.
Diethylene Glycol	111-46-6	203-872-2	Xn	R22	> 95.00 %W

3. HAZARDS IDENTIFICATION

Health Hazards	: Vapours expected to be slightly irritating. May cause moderate irritation to skin. Moderately irritating to eyes. Vapours may be irritating to the eye. Toxic: danger of very serious irreversible effects if swallowed. May cause drowsiness and dizziness. Possibility of organ or organ system damage from prolonged
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- exposure; see Chapter 11 for details. Target organ(s): Kidney. Intentional abuse, misuse or other massive exposure may cause multiple organ damage and or death.
- Signs and Symptoms** : Kidney damage may be indicated by changes in urine output or appearance, pain upon urination or in the lower back, or general oedema (swelling from fluid retention).
- Safety Hazards** : Not classified as flammable but will burn.

4. FIRST AID MEASURES




- Inhalation** : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
- Skin Contact** : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
- 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** : DO NOT DELAY. 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** : May cause significant renal, respiratory, and CNS toxicity. May cause significant acidosis. Consider: Gastric lavage with protected airway, alcohol dehydrogenase inhibitors such as alcohol.

5. FIRE FIGHTING MEASURES

- Specific Hazards** : Material will not burn unless preheated. Carbon monoxide may be evolved if incomplete combustion occurs. Containers exposed to intense heat from fires should be cooled with large quantities of water.
- Extinguishing Media** : Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use water in a jet.
- Protective Equipment for Firefighters** : Wear full protective clothing and self-contained breathing apparatus.
- Additional Advice** : Evacuate the area of all non-essential personnel. Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

- Protective measures** : Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or

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- Clean Up Methods** : other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.
- : Contain and cover the spillage with decontaminant, wet earth or wet sand and leave to react for at least 30 minutes. Contain run-off from residue flush and dispose of properly. Soak up residue with an absorbent such as clay, sand or other suitable material. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid 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.
- Additional Advice** : See Chapter 13 for information on disposal. Observe all relevant local regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Dike and contain spill water.

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 Chapter 8 of this Material Safety Data Sheet. For comprehensive advice on handling, product transfer, storage and tank cleaning refer to the product supplier.
- Handling** : Use local exhaust extraction over processing area. Handle and open container with care in a well-ventilated area. Do not empty into drains. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Handling Temperature: Ambient. 60 °C maximum
- Storage** : Tanks must be clean, dry and rust-free. Keep container tightly closed. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions. Drums should be stacked to a maximum of 3 high. Storage Temperature: Ambient. 60 °C maximum
- Product Transfer** : Keep containers closed when not in use. Do not pressurize drum containers to empty.
- Recommended Materials** : Stainless steel. Mild steel. Carbon steel

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

- Additional Information** : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select 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 unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN141.
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: Longer term protection: PVC. Neoprene rubber. 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, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
- Eye Protection** : Chemical splash goggles (chemical monogoggles).
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes. Chemical resistant gloves/gauntlets, boots, and apron.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of analytical Methods
<http://www.cdc.gov/niosh/nmam/nmammenu.html> Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha-slc.gov/dts/sltc/methods/toc.html> Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous

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Environmental Exposure Controls

Substances <http://www.hsl.gov.uk/search.htm>
 Berufsgenossenschaftliches Institut für Arbeitssicherheit (BIA),
 Germany <http://www.hvbg.de/d/bia/pub/grl/grle.htm> L'Institut
 National de Recherche et de Sécurité, (INRS), France
<http://www.inrs.fr/indexnosdoss.html>

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 ventilation to control airborne concentrations. Exhaust emission systems should be designed in accordance with local conditions; the air should always be moved away from the source of vapour generation and the person working at this point. Eye washes and showers for emergency use. Firewater monitors and deluge systems are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES



Appearance	: Slightly viscous liquid.
Boiling point	: 244 - 250 °C / 471 - 482 °F
Melting / freezing point	: -10 °C / 14 °F
Flash point	: 149 °C / 300 °F (Pensky-Martens Closed Cup)
Explosion / Flammability limits in air	: 3 - 7 % (V)
Auto-ignition temperature	: 225 °C / 437 °F
Vapour pressure	: < 1.3 Pa at 20 °C / 68 °F
Density	: 1,116 g/cm ³
Water solubility	: Completely Soluble
Kinematic viscosity	: 33 mm ² /s at 20 °C / 68 °F
State of aggregation	: Liquid/Solid
Stability	: Stable.
Volatile organic carbon content	: 100

10. STABILITY AND REACTIVITY

Stability	: Stable under normal conditions of use. Reacts with strong oxidising agents.
Conditions to Avoid	: High Temperature.
Materials to Avoid	: Strong oxidising agents. Strong acids. Strong bases.
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.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on product testing.
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Acute Oral Toxicity	: Low toxicity: LD50 >2000 mg/kg , Rat Ingestion may cause drowsiness and dizziness. Classified as harmful under EC criteria.
Acute Dermal Toxicity	: Low toxicity: LD50 >2000 mg/kg , Rat
Acute Inhalation Toxicity	: No deaths at highest tested dose. Expected to be of low toxicity: LC50 >5 mg/l / 4 hours, Rat
Skin Irritation	: May cause moderate skin irritation (but insufficient to classify).
Eye Irritation	: Moderately irritating to eyes (but insufficient to classify).
Respiratory Irritation	: Repeated inhalation of vapours and mists is expected to cause irritation of the respiratory tract.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Kidney: can cause kidney damage.
Mutagenicity	: No evidence of mutagenic activity.
Carcinogenicity	: Tumours produced in animals are not considered relevant to humans.
Reproductive and Developmental Toxicity	: Affects reproductive system in animals; considered to be secondary to other toxic effects.
Additional Information	: There is a marked difference in acute oral toxicity between animals and man, man being more susceptible than animals. The estimated fatal dose for man is 100 millilitres (1/2 cup).

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 > 1000 mg/l
Microorganisms	: Expected to have low toxicity: LC/EC/IC50 > 1000 mg/l
Mobility	: Dissolves in water. If product enters soil, it will be highly mobile and may contaminate groundwater.
Persistence/degradability	: Inherently biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Bioaccumulation	: Does not have the potential to bioaccumulate significantly.

13. DISPOSAL CONSIDERATIONS

Material Disposal	: Recover or recycle if possible. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Remove all packaging for recovery or waste disposal.
Container Disposal	: Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

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14. TRANSPORT INFORMATION

ADR

This material is not classified as dangerous under ADR regulations.

RID

This material is not classified as dangerous under RID regulations.

ADNR

This material is not classified as dangerous under ADNR regulations.

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.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material

EC Label Name	:	DIETHYLENE GLYCOL
EC label/EC Number	:	203-872-2
EC Classification	:	Harmful.
EC Annex I Number	:	603-140-00-6
EC Symbols	:	Xn Harmful.
EC Risk Phrases	:	R22 Harmful if swallowed.
EC Safety Phrases	:	S2 Keep out of the reach of children. S46 If swallowed, seek medical advice immediately and show this container or label.
AICS	:	Listed.
DSL	:	Listed.
INV (CN)	:	Listed.
ENCS (JP)	:	Listed. (2)-2979
ENCS (JP)	:	Listed. (2)-415
TSCA	:	Listed.
EINECS	:	Listed. 203-872-2
KECI (KR)	:	Listed. KE-27694
PICCS (PH)	:	Listed.

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16. OTHER INFORMATION

R-phrase(s)

R22 Harmful if swallowed.

MSDS Version Number : 1

MSDS Effective Date : 10.07.2003

MSDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

MSDS Regulation : The content and format of this safety data sheet is in accordance with Commission Directive 2001/58/EC of 27 July 2001, amending for the second time Commission Directive 91/155/EEC.

Uses and Restrictions : Do not use in the manufacture or preparation of foods or pharmaceuticals.
Keep out of reach of children and pets.
Do not use in theatrical fogs.

MSDS Distribution : The information in this document should be made available to all who may handle the product

Disclaimer : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.