# DIETHYLENE GLYCOL DIMETHYL ETHER

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME**

DIETHYLENE GLYCOL DIMETHYL ETHER

**OTHER NAMES**

C6-H14-O3, (CH3OCH2CH2)2O, "diethyl glycol dimethyl ether", "ethylene diglycol dimethyl ether", bis-(2-methoxyethyl)ether, "ether, bis(2-methoxyethyl)", "diglycol methyl ether" , "ethane, 1, 1'-oxybis(2-methoxy", "ethane, 1, 1'-oxybis(2-methoxy", "2-methoxyethyl ether", "2-methoxyethyl ether", Diglyme, dimethyl-digol

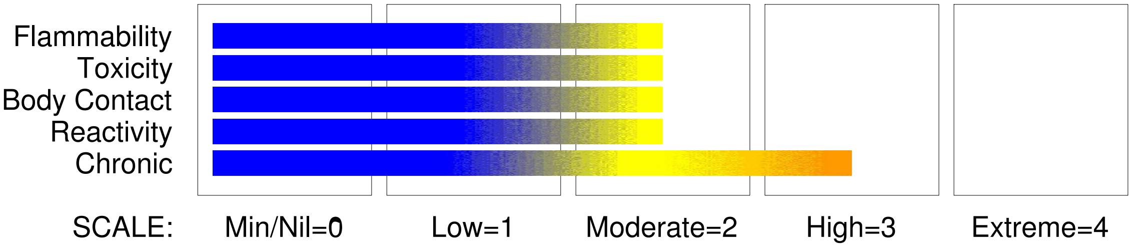
**PRODUCT USE**

Solvent, anhydrous reaction medium for organo-metallic synthesis.

**SUPPLIER**

Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

**HAZARD RATINGS**



## Section 2 - HAZARDS IDENTIFICATION

**GHS Classification**

Flammable Liquid Category 3
Reproductive Toxicity Category 1B
Respiratory Irritation Category 3

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## EMERGENCY OVERVIEW

### HAZARD

DANGER
Determined by using GHS criteria:
H335 H226 H227 H360 H360
May cause respiratory irritation
Flammable liquid and vapour
Combustible Liquid
May damage fertility
May damage the unborn child

### PRECAUTIONARY STATEMENTS

### Prevention

Use personal protective equipment as required.
Do not handle until all safety precautions have been read and understood.
Obtain special instructions before use.
Use explosion-proof electrical/ventilating/lighting/equipment
Keep away from flames and hot surfaces.

### Response

If exposed or concerned: Get medical attention advice.

### Storage

Store away from other materials
Store locked up.

### Disposal

Dispose of contents and container in accordance with relevant legislation.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|---|---|---|
| diethylene glycol dimethyl ether | 111-96-6 | >98 |

## Section 4 - FIRST AID MEASURES

### SWALLOWED

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

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## Section 4 - FIRST AID MEASURES

### EYE

If this product comes in contact with the eyes:

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- If pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

### SKIN

If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

### INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Other measures are usually unnecessary.

### NOTES TO PHYSICIAN

Treat symptomatically.

## Section 5 - FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

### FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

### FIRE/EXPLOSION HAZARD

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
- May emit acrid smoke.
- Mists containing combustible materials may be explosive.

Combustion products include: carbon dioxide ($CO_2$), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

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**FIRE INCOMPATIBILITY**

Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

**Personal Protective Equipment**

Chemical splash suit.

## Section 6 - ACCIDENTAL RELEASE MEASURES

### EMERGENCY PROCEDURES

**MINOR SPILLS**

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

**MAJOR SPILLS**

Moderate hazard.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

### EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

| | |
|---|---|
| diethylene glycol dimethyl ether | 400 ppm |

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

| | |
|---|---|
| diethylene glycol dimethyl ether | 25 ppm |

other than mild, transient adverse effects without perceiving a clearly defined odour is:

| | |
|---|---|
| diethylene glycol dimethyl ether | 15 ppm |

The threshold concentration below which most people will experience no appreciable risk of health effects:

| | |
|---|---|
| diethylene glycol dimethyl ether | 5 ppm |

continued...

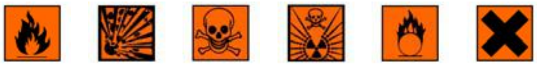
American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

| | | | |
|---|---|---|---|
| Very Toxic (T+) | >= 0.1% | Toxic (T) | >= 3.0% |
| R50 | >= 0.25% | Corrosive (C) | >= 5.0% |
| R51 | >= 2.5% | | |
| else | >= 10% | | |

where percentage is percentage of ingredient found in the mixture

## SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X X X X X +

*+: May be stored together*
*O: May be stored together with specific preventions*
*X: Must not be stored together*

**Personal Protective Equipment advice is contained in Section 8 of the MSDS.**

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

The substance accumulates peroxides which may become hazardous only if it evaporates or is distilled or otherwise treated to concentrate the peroxides. The substance may concentrate around the container opening for example.

Purchases of peroxidisable chemicals should be restricted to ensure that the chemical is used completely before it can become peroxidised.

- A responsible person should maintain an inventory of peroxidisable chemicals or annotate the general chemical inventory to indicate which chemicals are subject to peroxidation. An expiration date should be determined. The chemical should either be treated to remove peroxides or disposed of before this date.
- The person or laboratory receiving the chemical should record a receipt date on the

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bottle. The individual opening the container should add an opening date.
- Unopened containers received from the supplier should be safe to store for 18 months.
- Opened containers should not be stored for more than 12 months.

**SUITABLE CONTAINER**

DO NOT use aluminium or galvanised containers.
- Metal can or drum
- Packaging as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

**STORAGE INCOMPATIBILITY**

Glycol ethers may form peroxides under certain conditions. In the presence of strong bases or the salts of strong bases, at elevated temperatures, the potential exists for runaway reactions. Contact with aluminium should be avoided. Release of hydrogen gas may result.

Avoid reaction with oxidising agents.

WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.

Will corrode scratched aluminium surfaces.

Peroxides may be removed by stirring with a suspension of iron oxide in aqueous alcohol.

**STORAGE REQUIREMENTS**

Store in an upright position.

Easily peroxidisable. Products formed as a result of peroxidation are not only safety hazards but may chemically alter the chemical behavior of the parent compound. Should have a warning label affixed bearing the date of receipt in the laboratory and the date on which the label was first opened. Store-room items should have the label affixed by the Store-room whilst for non- storeroom items or materials synthesised in the laboratory , an individual chemist should be responsible for warning labels.

WARNING: This product may form peroxides to a hazardous level by concentration (by distillation, evaporation, etc.) Should be evaluated every twelve months after opening, redated if safe or else discarded. The oxidation of iodide to iodine or the conversion of colourless ferrothiocyanate to red ferrithiocyanate by peroxides are simple and convenient tests for most peroxides. Before distilling or evaporating test for peroxides. Leave at least 10% bottoms. Use a shield when evaporating or distilling mixtures which may contain peroxidisable compounds. Store away from heat and light. Particular attention should be paid to the adequacy of the closure on storage containers.

Peroxides may be removed by;
- passing the material over a column of ordinary activated alumina (care should be taken in disposal of the activated alumina);
- shaking with a concentrated solution of ferrous salt (provided the carrier solvent is water-insoluble);
- agitation with an approximately equimolar mixture of ferrous sulfate and sodium bisulfate;
- commercial quantities may be treated with a 5% solution of aqueous sodium carbonate.

Jackson et al: Control of Peroxizable Compounds; Safety in the Chemical Laboratory, Journal of Chemical Education; Vol 47, 1970, pp A175-A188

When solvents have been freed from peroxides by percolation through a column of activated alumina, the adsorbed peroxides must promptly be desorbed by treatment with polar solvents, methanol or water, which must in turn be discarded safely.
- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.

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## Section 7 - HANDLING AND STORAGE

- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

The following materials had no OELs on our records

• diethylene glycol dimethyl ether: CAS:111- 96- 6 CAS:70992- 86- 8 CAS:54631- 70- 8 CAS:142939- 39- 7

### MATERIAL DATA

No exposure limits set by NOHSC or ACGIH.
MAK value: 5 ppm, 28 mg/m3
Designated H in List of MAK values: Danger of cutaneous absorption.
Absorption of such substances through the skin can pose an incomparably larger danger of toxicity than their inhalation. To avoid health risks when handling such substances, meticulous cleaning of the skin, hair and clothing is imperative.
MAK Category II Peak Limitation: For substances with systemic effects and with a half -life in humans of less than two hours.
Allows excursions of 2 times the MAK value, for 30 minutes (on average), four times per shift.
MAK Group B: Currently available information indicates that the risk of damage to the developing embryo or foetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when exposure standards are observed.
MAK values, and categories and groups are those recommended within the Federal Republic of Germany.

### PERSONAL PROTECTION

#### EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be

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removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

**HANDS/FEET**

Wear chemical protective gloves, eg. PVC.
Wear safety footwear or safety gumboots, eg. Rubber.

**OTHER**

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

**RESPIRATOR**

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

| Breathing Zone Level ppm (volume) | Maximum Protection Factor | Half- face Respirator | Full- Face Respirator |
|---|---|---|---|
| 1000 | 10 | A- AUS | - |
| 1000 | 50 | - | A- AUS |
| 5000 | 50 | Airline * | - |
| 5000 | 100 | - | A- 2 |
| 10000 | 100 | - | A- 3 |
| | 100+ | | Airline** |

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult
your
Occupational Health and Safety Advisor.

**ENGINEERING CONTROLS**

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

| Type of Contaminant: | Air Speed: |
|---|---|
| solvent, vapours, degreasing etc., evaporating from tank (in still air). | 0.25- 0.5 m/s (50- 100 f/min) |
| aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation) | 0.5- 1 m/s (100- 200 f/min.) |
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, | 1- 2.5 m/s (200- 500 f/min.) |

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| | |
|---|---|
| gas discharge (active generation into zone of rapid air motion) | |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion) | 2.5- 10 m/s (500- 2000 f/min.) |

Within each range the appropriate value depends on:

| Lower end of the range | Upper end of the range |
|---|---|
| 1: Room air currents minimal or favourable to capture | 1: Disturbing room air currents |
| 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity |
| 3: Intermittent, low production. | 3: High production, heavy use |
| 4: Large hood or large air mass in motion | 4: Small hood- local control only |

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE

Colourless liquid with a mild ether-like odour; mixes with water, alcohol, ether and hydrocarbon solvents.

### PHYSICAL PROPERTIES

Liquid.
Mixes with water.

Molecular Weight: 134.20
Melting Range (℃): - 68
Solubility in water (g/L): Miscible
pH (1% solution): Not applicable
Volatile Component (%vol): 100
Relative Vapour Density (air=1): 4.6
Lower Explosive Limit (%): 1.5
Autoignition Temp (℃): 187
State: Liquid

Boiling Range (℃): 162
Specific Gravity (water=1): 0.945
pH (as supplied): Not applicable
Vapour Pressure (kPa): 0.40 @ 20 degC
Evaporation Rate: 36 BuAc=1
Flash Point (℃): 70 (Open cup)
Upper Explosive Limit (%): 17.4
Decomposition Temp (℃): Not available
Viscosity: Not Available

log Kow: -0.06

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## Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

## Section 11 - TOXICOLOGICAL INFORMATION

### POTENTIAL HEALTH EFFECTS

### ACUTE HEALTH EFFECTS

**SWALLOWED**

The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

**EYE**

Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).

**SKIN**

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

The material is not thought to be a skin irritant (i.e. is unlikely to produce irritant dermatitis as described in EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

Limited evidence exists, or practical experience predicts, that the material produces irritation of the respiratory system in a significant number of individuals following inhalation.

The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by

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narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.
Acute effects from inhalation of high concentrations of vapour are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterised by headache and dizziness, increased reaction time, fatigue and loss of co-ordination.

### CHRONIC HEALTH EFFECTS

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of: - clear evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.
There is sufficient evidence to provide a strong presumption that human exposure to the material may result in developmental toxicity, generally on the basis of:
- clear results in appropriate animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.
Studies with some glycol ethers (principally the monoethylene glycols) and their esters indicate reproductive changes, testicular atrophy, infertility and kidney function changes. The metabolic acetic acid derivatives of glycol ethers, not the ether itself, have been found to be the proximal reproductive toxin in animals. The potency of these metabolites decreases significantly as the chain length of the ether increases. Consequently glycol ethers with longer substituents (e.g diethylene glycols, triethylene glycols) have not generally been associated with reproductive effects. One of the most sensitive indicators of toxic effects observed from many of the glycol ethers is an increase in the erythrocytic osmotic fragility in rats. This appears to be related to the development of haemoglobinuria (blood in the urine) at higher exposure levels or as a result of chronic exposure.
Oral administration of the substance in pregnant mice produced a significant reduction in viable litters. Rabbit tests indicate that the substance may produce foetal abnormalities when the mother was exposed dermally to doses exceeding 750 mg/kg/day. Dermal exposure did produce decreased spleen weights in guinea pigs and significantly increased urinary calcium excretion. Mild changes in liver cells involving fatty changes were also evident.
Inhalation studies indicate that the substance does not produce a adverse effects in rats exposed to concentration as high as 216 ppm over 13 weeks.

## TOXICITY AND IRRITATION

No significant acute toxicological data identified in literature search.

## Section 12 - ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.
log Kow: -0.06
Koc: 20
Half-life (hr) air: 14
Henry's atm $m^3$ /mol: 2.28E-09
Log BCF: -0.28
Bioacculmulation: not sig
processes Abiotic: noRxnOH*/O3,photol,v slw hydrl

continued...

## Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.
- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

## Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

### REGULATIONS

diethylene glycol dimethyl ether (CAS: 111-96-6) is found on the following regulatory lists;
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for diethylene glycol dimethyl ether as CAS: 70992-86-8, CAS: 54631-70-8, CAS: 142939-39-7.

## Section 16 - OTHER INFORMATION

### INGREDIENTS WITH MULTIPLE CAS NUMBERS

| Ingredient Name | CAS |
|---|---|
| diethylene glycol dimethyl ether | 111- 96- 6, 70992- 86- 8, 54631- 70- 8, 142939- 39- 7 |

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## Section 16 - OTHER INFORMATION

### REPRODUCTIVE HEALTH GUIDELINES

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

| Ingredient | ORG | UF | Endpoint | CR | Adeq TLV |
|---|---|---|---|---|---|
| diethylene glycol dimethyl ether | 0.75 mg/m3 | 1000 | D | NA | - |

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive American Industrial Hygiene Association Journal 57: 641-649 (1996).

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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