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

Material Name	:	**CARADOL MD36-13**
Product Code	:	U3199
Other names / Synonyms	:	Polyol
Recommended use / Restrictions of use	:	Use for the manufacture of polyurethane products.
Supplier	:	SHELL EASTERN CHEMICALS (S) A REGISTERED BUSINESS OF SHELL EASTERN TRADING (PTE) LTD (UEN:198902087C) The Metropolis Tower 1 9 North Buona Vista Drive , #07-01 Singapore 138588 Singapore
Telephone	:	+65 6384 8737
Fax	:	+65 6384 8454
Emergency Telephone Number	:	+800 25 378747 (Alert SGS) or +65 65429595 (Alert SGS)
Other Information	:	CARADOL is a trademark owned by Shell Trademark Management B.V. and Shell Brands Inc. and used by affiliates of Royal Dutch Shell plc.

2. HAZARDS IDENTIFICATION

GHS Classification : NOT HAZARDOUS

GHS Label Elements

Symbol(s) :
No symbol

Signal Words : No signal word

GHS Hazard statements : PHYSICAL HAZARDS:
Not classified as a physical hazard under GHS criteria.
HEALTH HAZARDS:
Not classified as a health hazard under GHS criteria.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

GHS Precautionary Statements

Prevention : No precautionary phrases.

Response : No precautionary phrases.

Storage : No precautionary phrases.

Disposal : No precautionary phrases.

Other Hazards which do not result in classification : Not classified as flammable but will burn.

Aggravated Medical Condition : Not expected to be a health hazard when used under normal conditions.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Identity : CARADOL MD36-13
Synonyms : Polyol
CAS No. : 9082-00-2

Classification of components according to GHS

Chemical Name	Synonyms	CAS	Hazard Class (category)	Hazard statement	Conc.
Polyoxyalkylene Triol		9082-00-2	None, None;	None;	99.485 %

4. FIRST AID MEASURES

General Information : Not expected to be a health hazard when used under normal conditions.

The first aid measures for different exposure routes:

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.

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 : Wash out mouth with water and obtain medical attention.

Notes to physician

Most important symptoms/effects, acute & delayed : No specific adverse effects.

Immediate medical attention, special treatment : Treat symptomatically. Following cases of gross over-exposure, investigation of liver, kidney and eye function may be advisable. Records of such incidents should be maintained for future reference.

5. FIRE FIGHTING MEASURES

Specific Hazards : Clear fire area of all non-emergency personnel. Will only burn if enveloped in a pre-existing fire. Hazardous combustion products may include: Carbon dioxide. Unidentified organic and

inorganic compounds. Toxic products. Carbon monoxide.

Extinguishing Media	:	Large fires should only be fought by properly trained fire fighters. 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.
Other Advice	:	All storage areas should be provided with adequate fire fighting facilities. Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Personal Precautions, Protective Equipment and Emergency Procedures	:	Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Avoid inhaling vapour and/or mists. Avoid contact with the skin. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
Environmental Precautions	:	Remove all possible sources of ignition in the surrounding area. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.
Methods and Material for Containment and Clean Up	:	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. 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.
Additional Advice	:	Proper disposal should be evaluated based on regulatory status of this material (refer to Section 13), potential contamination from subsequent use and spillage, and regulations governing disposal in the local area. Observe all relevant local regulations.

7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing vapours or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. On 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.
Precautions for Safe Handling	:	In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. Use local exhaust extraction over processing area. Avoid unintentional contact with isocyanates to prevent uncontrolled polymerisation. Avoid contact with skin, eyes, and clothing. Air-dry contaminated clothing in a well-ventilated area before laundering. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Do not empty into drains. Handling Temperature: Ambient. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
Conditions for Safe Storage	:	Prevent all contact with water and with moist atmosphere. Tanks must be clean, dry and rust-free. Prevent ingress of water. Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat. Nitrogen blanket recommended for large tanks (capacity 100 m3 or higher). Drums should be stacked to a maximum of 3 high. Maximum storage time: 12 months. Storage Temperature: Ambient. Storage should be handled at temperatures such that viscosities are less than 500 cSt; typically at 25-50 °C. Tanks should be fitted with heating coils in areas where the ambient temperatures are below the recommended product handling temperatures. Heating coil skin temperatures should not exceed 100 °C.
Product Transfer	:	Lines should be purged with nitrogen before and after product transfer. Keep containers closed when not in use.
Unsuitable Materials	:	Copper. Copper alloys.
Other Advice	:	Ensure that all local regulations regarding handling and storage facilities are followed. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

None established.

Biological Exposure Index (BEI)

No biological limit allocated.

Appropriate Engineering Controls	:	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. Adequate ventilation to control airborne concentrations.

Individual Protection Measures	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
Respiratory Protection	:	No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material.
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Incidental contact/Splash 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. Thin disposable gloves should be avoided for long term use. When worn, use once and dispose. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
Eye Protection	:	Chemical splash goggles (chemical monogoggles). Approved to EU Standard EN166, AS/NZS:1337.
Body protection	:	Chemical and cold resistant gloves/gauntlets, boots, and apron.
Thermal hazards	:	Not applicable
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.gov/dts/sltc/methods/toc.html Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances, http://www.hsl.gov.uk/publications/mdhs.aspx. Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA), http://www.dguv.de/ifa/de/index.jsp L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/securite/hygiene_securite_travail.html.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear colourless Liquid.
Odour	:	Odourless
Odour threshold	:	Data not available.
pH	:	Data not available.

Initial Boiling point and boiling range	:	> 285 °C / 545 °F
Melting / freezing point	:	Data not available.
Flash point	:	> 220 °C / 428 °F
Explosion / Flammability limits in air	:	Data not available.
Ignition temperature	:	Data not available.
Auto-ignition temperature	:	Data not available.
Flammability (solid, gas)	:	Data not available.
Vapour pressure	:	< 10 hPa
Relative Density	:	1.02
Density	:	Typical 1.017 kg/m3 at 20 °C / 68 °F
Water solubility	:	Slightly soluble.
Solubility in other solvents	:	Data not available.
n-octanol/water partition coefficient (log Pow)	:	1.1 - 4.8
Decomposition temperature	:	Note: Stable.
Dynamic viscosity	:	1,100 mPa.s at 20 °C / 68 °F
Kinematic viscosity	:	Data not available.
Vapour density (air=1)	:	Data not available.
Evaporation rate (nBuAc=1)	:	Data not available.
Surface tension	:	Data not available.

10. STABILITY AND REACTIVITY

Chemical Stability	:	Stable.
Conditions to Avoid	:	Heat, flames, and sparks.
Incompatible Materials	:	Avoid contact with isocyanates, copper and copper alloys, zinc, strong oxidizing agents, and water.
Hazardous Decomposition Products	:	Unknown toxic products may be formed.
Possibility of Hazardous Reactions	:	Polymerises exothermically with di-isocyanates at ambient temperatures.
Sensitivity to Static Discharge	:	Data not available.

11. TOXICOLOGICAL INFORMATION

Information on Toxicological effects

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Likely Routes of Exposure	:	Exposure may occur via inhalation, ingestion, skin absorption and skin or eye contact.

Acute Toxicity

Acute Oral Toxicity	:	Not expected to be a hazard. LD50 >2000 mg/kg , Rat
Acute Dermal Toxicity	:	Not expected to be a hazard. LD50 >2000 mg/kg , Rat

Acute Inhalation Toxicity	:	Not expected to be a hazard.
Skin Corrosion/Irritation	:	Expected to be non-irritating to skin.
Serious Eye Damage/Irritation	:	Expected to be non-irritating to eyes.
Respiratory Irritation	:	Not expected to be a respiratory irritant.
Respiratory or skin sensitization	:	Not expected to be a skin sensitiser.
Aspiration hazard	:	Not considered an aspiration hazard.
Germ Cell Mutagenicity	:	Not expected to be mutagenic.
Carcinogenicity	:	Not expected to be carcinogenic.
Reproductive and Developmental Toxicity	:	Not expected to impair fertility. Not expected to be a developmental toxicant.
Specific target organ toxicity - single exposure	:	Not applicable
Specific target organ toxicity - repeated exposure	:	Not expected to be a hazard.

12. ECOLOGICAL INFORMATION

Basis for Assessment	:	Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.
Ecotoxicity:		
Acute Toxicity		
Fish	:	Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
Aquatic crustacea	:	Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
Algae/aquatic plants	:	Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
Microorganisms	:	Expected to have low toxicity: LC/EC/IC50 > 100 mg/l
Chronic Toxicity		
Fish	:	Data not available.
Aquatic crustacea	:	Data not available.
Mobility	:	If product enters soil, one or more constituents will be mobile and may contaminate groundwater.
Persistence/degradability	:	Expected to be not readily biodegradable.
Bioaccumulative Potential	:	Does not bioaccumulate significantly, MW > 1000.
Other Adverse Effects	:	Data not available.

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. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.

Container Disposal : Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Send to drum recoverer or metal reclaimer.

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.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Not regulated
This material is not classified as dangerous under ADR regulations.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution Category	:	Z
Ship Type	:	3
Product Name	:	Glycerol, propoxylated and ethoxylated
Special Precaution	:	Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	:	**This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.**

15. REGULATORY INFORMATION

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

Chemical Inventory Status

AICS	:	Listed.	
DSL	:	Listed.	
INV (CN)	:	Listed.	
TSCA	:	Listed.	
KECI (KR)	:	Listed.	KE-24605

PICCS (PH)	:	Listed.
EINECS	:	All components listed or polymer exempt.

16. OTHER INFORMATION

GHS Hazard statements

None None

MSDS Version Number	:	2.2
MSDS Effective Date	:	02.03.2012
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	:	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. Use for the manufacture of polyurethane products.
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.