SAFETY DATA SHEET
DIETHANOLAMINE 85%
REVISION 5, DATE 11 JUL 2020

1. IDENTIFICATION

Product Name	**Diethanolamine 85%**
Other Names	Diethanolamine, LFG 85
Uses	Chemical intermediate.
Chemical Family	No Data Available
Chemical Formula	C4H11NO2
Chemical Name	Contains: Diethanolamine
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust)	Schedule 6

Globally Harmonised System

Hazard Classification

Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

Hazard Categories

Acute Toxicity (Oral) - Category 4

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Irritation - Category 1

Specific Target Organ Toxicity (Repeated Exposure) - Category 2

Acute Hazard To The Aquatic Environment - Category 2

Long-term Hazard To The Aquatic Environment - Category 3

Pictograms

Signal Word

Danger

Hazard Statements

H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H373	May cause damage to organs (Kidney, Liver, Blood) through prolonged or repeated exposure if swallowed.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements

Prevention	**P270**	Do not eat, drink or smoke when using this product.
	P273	Avoid release to the environment.
	P280	Wear protective gloves/eye protection/face protection.
	P260	Do not breathe mist/vapour/spray.
Response	**P301 + P312**	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
	P302 + P352	IF ON SKIN: Wash with plenty of water.
	P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTRE/doctor.
	P314	Get medical attention if you feel unwell.
	P330	Rinse mouth.
	P332 + P313	If skin irritation occurs: Get medical attention.
	P362	Take off contaminated clothing.
Disposal	**P501**	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification

NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Diethanolamine	C4H11NO2	111-42-2	85 %
Water	H2O	7732-18-5	15 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed IF SWALLOWED: Rinse mouth, then give one cup of water or milk if available. Do NOT induce vomiting. Call a Poison Centre or doctor/physician for advice. Never give anything by mouth to an unconscious person.

Eye IF IN EYES: Immediately flush eyes with running water for several minutes, holding eyelids open and occasionally lifting the upper and lower lids. Remove contact lenses if present and easy to do. Continue rinsing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

Skin IF ON SKIN (or hair): Remove contaminated clothing and shoes immediately. Flush skin and hair with running water for at least 15 minutes. If skin irritation occurs, get medical advice/attention. Wash contaminated clothing and shoes before reuse.

Inhaled IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.

Advice to Doctor No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. First Aid responders should pay attention to self-protection and use the recommended protective clothing (see SECTION 8).
*If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns and/or ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal or esophageal control if lavage is done.

Medical Conditions Aggravated by Exposure No information available.

5. FIRE FIGHTING MEASURES

General Measures If safe to do so, move undamaged containers from fire area. Cool containers with water spray until well after fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

Flammability Conditions May burn but does not ignite readily.

Extinguishing Media Use dry chemical, Carbon dioxide (CO2), foam or water spray for extinction - Do not use water jet (May spread fire).
*Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire and Explosion Hazard Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Hazardous Products of Combustion During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include Nitrogen oxides, Carbon monoxide, Carbon dioxide.

Special Fire Fighting Instructions Contain runoff from fire control or dilution water - Runoff may pollute waterways.

Personal Protective Equipment Wear self-contained breathing apparatus (SCBA) and chemical splash suit. SCBA and structural firefighter's uniform may provide limited protection.

Flash Point 168 °C [Pensky-Martens Closed Cup]

Lower Explosion Limit No Data Available

Upper Explosion Limit No Data Available

Auto Ignition Temperature	No Data Available
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation. ELIMINATE all ignition sources. Do not touch or walk through spilled material. Do not breathe vapours and avoid contact with eyes, skin and clothing.
Clean Up Procedures	Pump large spills into suitable and properly labelled containers. Absorb small spills with earth, sand or other non-combustible material and transfer to suitable and properly labelled containers for disposal (see SECTION 13).
Containment	Stop leak if safe to do so – Prevent entry into waterways, drains or confined areas.
Decontamination	No information available.
Environmental Precautionary Measures	Prevent from entering into soil, ditches, sewers, waterways and/or groundwater.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away.
Personal Precautionary Measures	Use personal protective equipment as required (see SECTION 8).

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Do not breathe mist/vapours/spray and avoid contact with eyes, skin and clothing. Do not ingest. Use personal protective equipment as required (see SECTION 8). Avoid release to the environment.
Storage	Store in a dry and well-ventilated place. Avoid moisture. Protect from freezing. Keep away from incompatible materials (see SECTION 10). *Storage temperature: 34 - 49 °C
Container	Keep in the original container. Do not store in Aluminum, Copper, Copper alloys.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	For Diethanolamine (CAS No. 111-42-2): - Safe Work Australia Exposure Standard: TWA = 3 ppm (13 mg/m3). - New Zealand Workplace Exposure Standard: TWA = 3 ppm (13 mg/m3); Skin absorption (skin).
Exposure Limits	No Data Available
Biological Limits	No information available.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. 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.
Personal Protection Equipment	- Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines, when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator. Recommended: Organic vapour cartridge with a particulate pre-filter (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Use chemical goggles. - Hand protection: Wear protective gloves. Recommended: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur, e.g. Chlorinated polyethylene, Polyethylene, Ethyl vinyl alcohol laminate (EVAL). The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

	- Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as face-shield, boots, apron or full-body suit will depend on the task.
Special Hazards Precaustions	Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed.
Work Hygienic Practices	Do not eat, drink or smoke when using this product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Liquid
Odour	Ammoniacal
Colour	Colourless to yellow
pH	No Data Available
Vapour Pressure	3.5 mmHg [Literature] (@ 20 °C)
Relative Vapour Density	2.1 Air = 1
Boiling Point	127 °C [Literature]
Melting Point	No Data Available
Freezing Point	Approx. -6 °C
Solubility	Completely miscible with water
Specific Gravity	1.094 (Water = 1)
Flash Point	168 °C [Pensky-Martens Closed Cup]
Auto Ignition Temp	No Data Available
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	1.06 - 1.09 g/cm3 (Liquid Density) [Literature]
Specific Heat	No Data Available
Molecular Weight	No Data Available
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	Approx. 100 cP (@ 30 °C)
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No information available.
Potential for Dust Explosion	Not applicable.
Fast or Intensely Burning Characteristics	No information available.
Flame Propagation or Burning Rate of Solid Materials	No information available.
Non-Flammables That Could Contribute Unusual Hazards to a Fire	Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Properties That May Initiate or Contribute to Fire Intensity	May burn but does not ignite readily.
Reactions That Release Gases or Vapours	During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include Nitrogen oxides, Carbon monoxide, Carbon dioxide.
Release of Invisible Flammable Vapours and Gases	Heating above 60°C in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas.

10. STABILITY AND REACTIVITY

General Information	Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases. Corrosive when wet.
Chemical Stability	Stable under recommended storage conditions.
Conditions to Avoid	Avoid moisture. Avoid exposure to elevated temperatures.
Materials to Avoid	Incompatible/reactive with Nitrites, Strong acids, Strong oxidizers. Avoid unintended contact with Halogenated hydrocarbons.
Hazardous Decomposition Products	Decomposition products depend upon temperature, air supply and the presence of other materials.
Hazardous Polymerisation	Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: Harmful if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in gastrointestinal irritation or ulceration. Prolonged skin contact is unlikely to result in absorption of harmful amounts. At room temperature, exposure to vapour is minimal due to low volatility.
- Skin corrosion/irritation: Causes skin irritation. Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage. May cause more severe response if skin is abraded.
- Eye damage/irritation: Causes serious eye damage. May cause severe corneal injury (Diethanolamine).
- Respiratory/skin sensitisation: Did not cause allergic skin reactions when tested in guinea pigs (Diethanolamine).
- Germ cell mutagenicity: In vitro genetic toxicity studies were negative; Animal genetic toxicity studies were negative (Diethanolamine).
- Carcinogenicity: Findings from a chronic Diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. A number of factors may have influenced the results and are being considered in their interpretation.
- Reproductive toxicity: In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Repeated excessive exposures to high amounts may cause effects on testes and fertility in males (Diethanolamine).
- STOT (single exposure): Evaluation of available data suggests that this material is not an STOT-SE toxicant. Vapour from heated material may cause respiratory irritation and other effects.
- STOT (repeated exposure): Results from repeated exposure tests on Diethanolamine in laboratory animals include anemia (rats) and effects on kidney (rats and mice) and liver (mice). Heart and nervous system effects were also observed in animals given exaggerated doses of Diethanolamine. Changes in other organs, causes of which are nonspecific, were judged secondary to the poor health of the animals due to the extremely high doses of Diethanolamine given.
- Aspiration toxicity: Based on physical properties, not likely to be an aspiration hazard.

Acute

Ingestion	Acute toxicity (Oral): COMPONENT: Diethanolamine: - LD50, Rat (male/female): 1,600 mg/kg [OECD 401 or equivalent].
Other	Acute toxicity (Dermal): COMPONENT: Diethanolamine: - LD50, Rabbit (male): >8,200 mg/kg

Inhalation	Acute toxicity (Inhalation): COMPONENT: Diethanolamine: - LC0, Rat (male): 3.35 mg/l (4 h) Aerosol
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: - Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested). - May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms. - Chronic NOEC, Crustacea (Daphnia magna): 0.78 mg/l (21 d) semi-static test.
Persistence/Degradability	Material is readily biodegradable. - 10-day Window: Pass - Biodegradation: 93 % (28 d) [OECD Test Guideline 301F or Equivalent].
Mobility	Volatilization from natural bodies of water or moist soil is not expected to be an important fate process. Potential for mobility in soil is very high (Koc between 0 and 50). - Partition coefficient (Koc): 1 [Estimated].
Environmental Fate	Toxic to aquatic life/Harmful to aquatic life with long lasting effects - Avoid release to the environment.
Bioaccumulation Potential	Bioconcentration potential is low (BCF < 100 or Log Pow < 3). - Partition coefficient: n-octanol/water (log Pow): -2.18 at 25 °C [OECD Test Guideline 107 or Equivalent].
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	All disposal practices must be in compliance with all federal, state/provincial and local laws and regulations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.
Special Precautions for Land Fill	For unused and uncontaminated product, the preferred disposal options include sending to a licensed, permitted incinerator or other thermal destruction device.

14. TRANSPORT INFORMATION

Land Transport (Australia)
ADG Code

Proper Shipping Name	Diethanolamine 85%
Class	C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (Malaysia)
ADR Code

Proper Shipping Name	Diethanolamine 85%
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	Diethanolamine 85%
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Land Transport (United States of America)
US DOT

Proper Shipping Name	Diethanolamine 85%
Class	No Data Available
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for LAND transport.

Sea Transport
IMDG Code

Proper Shipping Name	Diethanolamine 85%
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
EMS	No Data Available
Marine Pollutant	No

Comments	NON-DANGEROUS GOODS: Not regulated for SEA transport.

Air Transport
IATA DGR

Proper Shipping Name	Diethanolamine 85%
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
Comments	NON-DANGEROUS GOODS: Not regulated for AIR transport.

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	Schedule 6

Environmental Protection Authority (New Zealand)
Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	Additives Process Chemicals and Raw Materials Subsidiary Hazard Group Standard 2020 HSR002503 *HSR006521 (Revoked)

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	Not Determined
Europe (REACh)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Not Determined
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed

Philippines (PICCS)	Not Determined
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Not Determined

16. OTHER INFORMATION

Related Product Codes	DIETHA1026, DIETHA2500, DIETHA2870, DIETHA2871, DIETHA2880, DIETHA2890, DIETHA3500, DIETHA5500, DIETHA5501, DIETHA6000, DIETHA7084, DIETHA7085, DIETHA7086, DIETHA7087, DIETHA8000, DIETHA8001, DIETHA8300, DIETHA8301, DIETHA8400, DIETHA8401, DIETHA8402, DIETHA8500, DIETHA8501, DIETHA8502, DIETHA8600, DIETHA8601, DIETHA8700, DIETHA8701, DIETHA8710, DIETHA8715, DIETHA8800, DIETHA8801, DIETHA8900, DIETHA8901, DIETHA9000, DIETHB8500, DIETHB8501
Revision	5
Revision Date	11 Jul 2020
Reason for Issue	SDS updated
Key/Legend	< Less Than > Greater Than **AICS** Australian Inventory of Chemical Substances **atm** Atmosphere **CAS** Chemical Abstracts Service (Registry Number) **cm^2** Square Centimetres **CO2** Carbon Dioxide **COD** Chemical Oxygen Demand **deg C (°C)** Degrees Celcius **EPA (New Zealand)** Environmental Protection Authority of New Zealand **deg F (°F)** Degrees Farenheit **g** Grams **g/cm^3** Grams per Cubic Centimetre **g/l** Grams per Litre **HSNO** Hazardous Substance and New Organism **IDLH** Immediately Dangerous to Life and Health **immiscible** Liquids are insoluable in each other. **inHg** Inch of Mercury **inH2O** Inch of Water **K** Kelvin **kg** Kilogram **kg/m^3** Kilograms per Cubic Metre **lb** Pound **LC50** LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours. **LD50** LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals. **ltr** or **L** Litre **m^3** Cubic Metre **mbar** Millibar **mg** Milligram **mg/24H** Milligrams per 24 Hours **mg/kg** Milligrams per Kilogram **mg/m^3** Milligrams per Cubic Metre **Misc** or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present. **mm** Millimetre **mmH2O** Millimetres of Water **mPa.s** Millipascals per Second

N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Heath and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight