



SAFETY DATA SHEET TRIETHYLENETETRAMINE (TETA) REVISION 4, DATE 25 NOV 19

1. IDENTIFICATION

Product Name	Triethylenetetramine (TETA)
Other Names	No Data Available
Uses	General industrial products.
Chemical Family	No Data Available
Chemical Formula	C ₆ H ₁₈ N ₄
Chemical Name	1,2-Ethanediamine, N,N'-bis(2-aminoethyl)-
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)

Not Scheduled



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 Acute Toxicity (Dermal) - Category 4 Skin Corrosion/Irritation - Category 1B Serious Eye Damage/Irritation - Category 1 Sensitisation (Skin) - Category 1 Toxic To Reproduction - Category 2 Specific Target Organ Toxicity (Single Exposure) - Category 3 Acute Hazard To The Aquatic Environment - Category 2 Long-term Hazard To The Aquatic Environment - Category 2	
Pictograms		   	
Signal Word		Danger	
Hazard Statements		H302 + H312 H314 H317 H335 H361fd H411	Harmful if swallowed or in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. May cause respiratory irritation. Suspected of damaging fertility. Suspected of damaging the unborn child. Toxic to aquatic life with long lasting effects.
Precautionary Statements	Prevention	P260	Do not breathe mist/vapour/spray.
		P280	Wear protective gloves/protective clothing/eye protection/face protection.
		P201	Obtain special instructions before use.
		P273	Avoid release to the environment.
		P270	Do not eat, drink or smoke when using this product.
		P272	Contaminated work clothing should not be allowed out of the workplace.
		P271	Use only outdoors or in a well-ventilated area.
	Response	P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
		P310	Immediately call a POISON CENTER or doctor.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
		P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
		P363	Wash contaminated clothing before reuse.
		P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
		P308 + P313	IF exposed or concerned: Get medical advice/ attention.
		P391	Collect spillage.
		P304 + P340	IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
		P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
	Storage	P405	Store locked up.
	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

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
Triethylenetetramine	C6H18N4	112-24-3	>60 - 100 %
Diethylenetriamine	C4H13N3	111-40-0	0 - 1 %

4. FIRST AID MEASURES*Description of necessary measures according to routes of exposure*

Swallowed	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately 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 flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes. Get immediate medical advice/attention.
Skin	IF ON SKIN (or hair): Remove (and isolate) contaminated clothing and shoes immediately. Flush skin and hair with running water for at least 15 minutes. For minor skin contact, avoid spreading material onto unaffected skin. Immediately call a Poison Centre or doctor/physician for advice. Wash contaminated clothing before storage or reuse.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a Poison Centre or doctor/physician for advice. Apply resuscitation if victim is not breathing - Do not use direct mouth-to-mouth method if victim ingested or inhaled the substance; use alternative respiratory method or proper respiratory device. Administer oxygen if breathing is difficult.
Advice to Doctor	If exposed or concerned, get medical advice/attention. Effects of exposure (inhalation, ingestion, skin or eye contact) to substance may be delayed. Keep victim calm and warm - Obtain immediate medical care. Ensure that attending medical personnel are aware of identity and nature of product(s) involved, and take precautions to protect themselves.
Medical Conditions Aggravated by Exposure	May cause an allergic skin reaction.

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. Avoid getting water inside containers.
Flammability Conditions	Combustible; 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 jets.
Fire and Explosion Hazard	Containers may explode when heated. When heated, vapours may form explosive mixtures with air.
Hazardous Products of Combustion	Fire will produce irritating, toxic and/or corrosive gases, including Carbon oxides, Nitrogen oxides.
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may be toxic and/or corrosive and pollute waterways.
Personal Protective Equipment	Wear self-contained breathing apparatus (SCBA) and chemical splash suit. Fully-encapsulating, gas-tight suits should be

worn for maximum protection. Structural firefighter's uniform is NOT effective for this material.

Flash Point	137 °C [COC]
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	335 °C
Hazchem Code	2X

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation - Ventilate enclosed spaces before entering. ELIMINATE all ignition sources. Do not touch or walk through spilled material. Do not breathe vapours; Do not get in eyes, on skin or on clothing.
Clean Up Procedures	Absorb with earth, sand or other non-combustible material and transfer to a suitable container for disposal (see SECTION 13).
Containment	Stop leak if safe to do so – Prevent entry into waterways, drains or confined areas. Dike or cover with plastic sheet to prevent spreading.
Decontamination	No information available.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away. Keep upwind and to higher ground.
Personal Precautionary Measures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (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 - Use only outdoors or in a well-ventilated area. Obtain special instructions before use - Do not handle until all safety precautions have been read and understood. Do not breathe mist/vapours/spray and prevent contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/protective clothing/eye protection/face protection (see SECTION 8). Avoid release to the environment - Collect spillage (see SECTION 6).
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep container tightly closed. Keep away from heat and sources of ignition - No smoking. Keep away from foodstuffs and incompatible materials (see SECTION 10). Store locked up.
Container	Keep only in the original container or use containers made of zinc phosphate treated carbon steel, tin coated steel, polyethylene and stainless-steel.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product. COMPONENT: Diethylenetriamine (CAS No. 111-40-0): - Safe Work Australia Exposure Standard: TWA = 1 ppm (4.2 mg/m ³); Absorption through the skin may be a significant source of exposure; Respiratory and/or skin sensitiser (Sk:Sen). - New Zealand Workplace Exposure Standard: TWA = 1 ppm (4.2 mg/m ³); 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	<ul style="list-style-type: none"> - Respiratory protection: Wear respiratory protection if exposure limits are exceeded or if irritation or other symptoms are experienced. Recommended: Supplied-air respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Tight sealing safety goggles or safety glasses and face-shield. - Hand protection: Wear protective gloves. Recommended: Rubber or resin gloves. - Skin/body protection: Wear appropriate personal protective clothing to prevent skin contact. Recommended: Protective clothing, boots and apron.
Special Hazards Precautions	No information available.
Work Hygienic Practices	Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Remove contaminated clothing and shoes immediately and wash before storage or reuse. Contaminated work clothing should not be allowed out of the workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Ammonia-like
Colour	Pale yellow
pH	12.4 (25% aq. sol'n @ 25°C)
Vapour Pressure	<1 hPa (@ 20 °C)
Relative Vapour Density	5.05 Air = 1
Boiling Point	183 °C
Melting Point	No Data Available
Freezing Point	-35 °C
Solubility	Readily soluble in water
Specific Gravity	0.981
Flash Point	137 °C [COC]
Auto Ignition Temp	335 °C
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	No Data Available
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	No Data Available
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	No information available.
Properties That May Initiate or Contribute to Fire Intensity	Combustible; May burn but does not ignite readily.
Reactions That Release Gases or Vapours	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides, Nitrogen oxides.
Release of Invisible Flammable Vapours and Gases	When heated, vapours may form explosive mixtures with air.

10. STABILITY AND REACTIVITY

General Information	Reaction with oxygen in the air may discolour the product. If exposed to air, this product absorbs moisture. This product reacts with carbon dioxide gas and crystalline salts may be formed.
Chemical Stability	Stable under normal conditions.
Conditions to Avoid	Avoid excessive heat and sources of ignition. Avoid direct sunlight.
Materials to Avoid	Incompatible/reactive with oxidising substances (danger of ignition and explosion) and acidic substances (heat generation). Corrosive to copper and its alloys.
Hazardous Decomposition Products	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides, Nitrogen oxides.
Hazardous Polymerisation	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

General Information	<ul style="list-style-type: none"> - Acute toxicity: Product is a corrosive material. Harmful if swallowed and in contact with skin. Ingestion causes severe swelling, severe damage to tissue and possible perforation of stomach or esophagus. - Skin corrosion/irritation: Causes severe skin burns. - Eye damage/irritation: Causes serious eye damage. - Respiratory/skin sensitisation: May cause an allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, light-headedness, chest pain, muscle pain or flushing. - Germ cell mutagenicity: COMPONENT: Triethylenetetramine (CAS No. 112-24-3): Negative (Mouse micronucleus assay). COMPONENT: Diethylenetriamine (CAS No. 111-40-0): Negative (In vivo somatic cell mutagenicity test: micronucleus assay). - Carcinogenicity: No information available. - Reproductive toxicity: Suspected of damaging fertility or the unborn child. COMPONENT: Diethylenetriamine (CAS No. 111-40-0): In rat reproduction/developmental toxicity test [OECD TG 421], doses that were not toxic to maternal animals caused prolonged gestation period, increase of embryo-fetal death, etc. - STOT (single exposure): May cause respiratory irritation. Reversible, slight inflammation of mucous membranes and inhibition of respiration were observed in mice, rats, rabbits, and guinea pigs. In addition, exposure to aerosol caused reversible respiratory tract irritation. - STOT (repeated exposure): No information available. - Aspiration toxicity: No information available.
Acute	
Ingestion	<p>Acute toxicity (Oral):</p> <p>COMPONENT: Triethylenetetramine (CAS No. 112-24-3):</p> <ul style="list-style-type: none"> - LD50, Rat: 1,716 mg/kg [REACH]. <p>COMPONENT: Diethylenetriamine (CAS No. 111-40-0):</p> <ul style="list-style-type: none"> - LD50, Rat: 1,140 mg/kg [SIDS].

Other

Acute toxicity (Dermal):
COMPONENT: Triethylenetetramine (CAS No. 112-24-3):
- LD50, Rabbit: 1,465 mg/kg [REACH].
COMPONENT: Diethylenetriamine (CAS No. 111-40-0):
- LD50, Rabbit: 672 - 1,040 mg/kg [SIDS].

Carcinogen Category

None

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Aquatic toxicity:
COMPONENT: Triethylenetetramine (CAS No. 112-24-3):
- LC50, Fish (*Poecilia reticulata*): 570 mg/L (96 h).
- EC50, Algae/aquatic plants (*Scenedesmus acuminatus*): 2.5 mg/L (72 h).
COMPONENT: Diethylenetriamine (CAS No. 111-40-0):
- EC50, Crustacea (*Daphnia magna*): 16 mg/L (48 h).

Persistence/Degradability

Persistence is unlikely.

Mobility

No information available.

Environmental Fate

Toxic to aquatic life with long lasting effects - Avoid release to the environment.

Bioaccumulation Potential

Bioaccumulation potential is considered low.

Environmental Impact

No Data Available

13. DISPOSAL CONSIDERATIONS**General Information**

Dispose of residual wastes to an approved/specialised disposal service in accordance with local/regional/national regulations.

Special Precautions for Land Fill

Contaminated packaging: In case of disposal of empty containers, remove contents completely beforehand. Consign to an approved/specialised industrial waste disposal collector or service.

14. TRANSPORT INFORMATION**Land Transport (Australia)**

ADG Code

Proper Shipping Name

TRIETHYLENETETRAMINE

Class

8 Corrosive Substances

Subsidiary Risk(s)

C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable

EPG

36 Toxic And/Or Corrosive Substances Combustible

UN Number

2259

Hazchem

2X

Pack Group

II

Special Provision

No Data Available

Land Transport (Malaysia)

ADR Code

Proper Shipping Name

TRIETHYLENETETRAMINE

SAFETY DATA SHEET TRIETHYLENETETRAMINE (TETA) REVISION 4, DATE 25 NOV 19

Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	36 Toxic And/Or Corrosive Substances Combustible
UN Number	2259
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Land Transport (New Zealand)

NZS5433

Proper Shipping Name	TRIETHYLENETETRAMINE
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	36 Toxic And/Or Corrosive Substances Combustible
UN Number	2259
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Land Transport (United States of America)

US DOT

Proper Shipping Name	TRIETHYLENETETRAMINE
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
ERG	153 Substances - Toxic and/or Corrosive (Combustible)
UN Number	2259
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Sea Transport

IMDG Code

Proper Shipping Name	TRIETHYLENETETRAMINE
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	2259
Hazchem	2X
Pack Group	II
Special Provision	No Data Available
EMS	F-A, S-B
Marine Pollutant	No

Air Transport

IATA DGR

Proper Shipping Name	TRIETHYLENETETRAMINE
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	2259

SAFETY DATA SHEET TRIETHYLENETETRAMINE (TETA) REVISION 4, DATE 25 NOV 19

Hazchem	2X
Pack Group	II
Special Provision	No Data Available

National Transport Commission (Australia)

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

Dangerous Goods Classification	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)	Not Scheduled

National/Regional Inventories

Australia (AIC)	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	TRETTE1000, TRETTE1001, TRETTE1002, TRETTE1003, TRETTE1004, TRETTE1100, TRETTE2000, TRETTE3000, TRETTE3100, TRETTE4000, TRETTE5000, TRETTE6000, TRETTE7000, TRETTE8000
-----------------------	--

Revision	4
Revision Date	25 Nov 2019
Key/Legend	<p>< Less Than</p> <p>> Greater Than</p> <p>AICS Australian Inventory of Chemical Substances</p> <p>atm Atmosphere</p> <p>CAS Chemical Abstracts Service (Registry Number)</p> <p>cm² Square Centimetres</p> <p>CO₂ Carbon Dioxide</p> <p>COD Chemical Oxygen Demand</p> <p>deg C (°C) Degrees Celcius</p> <p>EPA (New Zealand) Environmental Protection Authority of New Zealand</p> <p>deg F (°F) Degrees Farenheit</p> <p>g Grams</p> <p>g/cm³ Grams per Cubic Centimetre</p> <p>g/l Grams per Litre</p> <p>HSNO Hazardous Substance and New Organism</p> <p>IDLH Immediately Dangerous to Life and Health</p> <p>immiscible Liquids are insoluable in each other.</p> <p>inHg Inch of Mercury</p> <p>inH₂O Inch of Water</p> <p>K Kelvin</p> <p>kg Kilogram</p> <p>kg/m³ Kilograms per Cubic Metre</p> <p>lb Pound</p> <p>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.</p> <p>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.</p> <p>ltr or L Litre</p> <p>m³ Cubic Metre</p> <p>mbar Millibar</p> <p>mg Milligram</p> <p>mg/24H Milligrams per 24 Hours</p> <p>mg/kg Milligrams per Kilogram</p> <p>mg/m³ Milligrams per Cubic Metre</p> <p>Misc or Miscible Liquids form one homogeneous liquid phase regardless of the amount of either component present.</p> <p>mm Millimetre</p> <p>mmH₂O Millimetres of Water</p> <p>mPa.s Millipascals per Second</p> <p>N/A Not Applicable</p> <p>NIOSH National Institute for Occupational Safety and Health</p> <p>NOHSC National Occupational Heath and Safety Commission</p> <p>OECD Organisation for Economic Co-operation and Development</p> <p>Oz Ounce</p> <p>PEL Permissible Exposure Limit</p> <p>Pa Pascal</p> <p>ppb Parts per Billion</p> <p>ppm Parts per Million</p> <p>ppm/2h Parts per Million per 2 Hours</p> <p>ppm/6h Parts per Million per 6 Hours</p> <p>psi Pounds per Square Inch</p> <p>R Rankine</p> <p>RCP Reciprocal Calculation Procedure</p> <p>STEL Short Term Exposure Limit</p> <p>TLV Threshold Limit Value</p> <p>tne Tonne</p> <p>TWA Time Weighted Average</p> <p>ug/24H Micrograms per 24 Hours</p> <p>UN United Nations</p> <p>wt Weight</p>