



SAFETY DATA SHEET CHOLINE CHLORIDE ON CARRIER REVISION 5, DATE 01 SEP 23

1. IDENTIFICATION

Product Name	Choline Chloride on Carrier
Other Names	2-Hydroxy-N,N,N-Trimethylethanaminium chloride; Choline chloride 60% on Cereal Carrier; Choline chloride 60% on Corn Cob; Choline chloride 70% on Cereal Carrier; Choline chloride 70% on Corn Cob
Uses	Animal feed.
Chemical Family	No Data Available
Chemical Formula	C ₅ H ₁₄ NO.Cl
Chemical Name	Ethanaminium, 2-hydroxy-N,N,N-trimethyl-, chloride
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

Redox Ltd
Corporate Office Sydney
Locked Bag 15 Minto NSW 2566 Australia
2 Swettenham Road Minto NSW 2566 Australia
All Deliveries: 4 Holmes Road Minto NSW 2566 Australia

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E-mail sydney@redox.com
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ABN 92 000 762 345

Australia
Adelaide
Brisbane
Melbourne
Perth
Sydney

New Zealand
Auckland
Christchurch
Hawke's Bay
UK
London

Malaysia
Kuala Lumpur
USA
Los Angeles
Oakland
Mexico
Saltillo



Globally Harmonised System

Hazard Classification	NOT hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)
Signal Word	None

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)
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Safe Work Australia

National Guide for Classifying Hazardous Chemicals under the Model WHS Regulations

Hazard Classification	NOT hazardous according to the criteria of Safe Work Australia under Model WHS Regulations
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3. COMPOSITION/INFORMATION ON INGREDIENTS**Ingredients**

Chemical Entity	Formula	CAS Number	Proportion
Choline chloride	C5H14NO.Cl	67-48-1	60 - 70 %
Carrier: Corn cob/Cereal	Unspecified	Unspecified	30 - 40 %

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

Swallowed	IF SWALLOWED: Rinse mouth, then drink plenty of water. Do not induce vomiting. Get medical advice/attention if you feel unwell. Never give anything by mouth to an unconscious person.
Eye	IF IN EYES: Protect unharmed eye! 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 for at least 15 minutes. If eye irritation persists, get medical advice/attention.
Skin	IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If respiratory symptoms persist, get medical advice/attention. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
Advice to Doctor	Treat symptomatically. Show this safety data sheet (SDS) to the doctor in attendance. *Most important symptoms and effects, both acute and delayed: May cause slight irritation of the skin and eyes.
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. Dike fire-control water for later disposal.
Flammability Conditions	Combustible solid; may burn but does not ignite readily.
Extinguishing Media	Use dry chemical, Carbon dioxide (CO ₂), foam or water spray for extinction - Do not scatter spilled material with high-pressure water streams.
Fire and Explosion Hazard	Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Hazardous Products of Combustion	Fire may produce irritating, corrosive and/or toxic gases, including Carbon monoxide, Carbon dioxide, Nitrogen oxides and Hydrogen chloride gas.
Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may cause pollution. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Personal Protective Equipment	Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.
Flash Point	No Data Available
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 (if dust clouds can occur). Do not touch or walk through spilled material - may be slippery when spilled! Avoid generating dust. Avoid breathing dust and contact with eyes, skin and clothing.
Clean Up Procedures	Vacuum or sweep up material and place into a suitable container for disposal (see SECTION 13).
Containment	Stop leak if you can do it without risk. Prevent dust cloud. Prevent entry into waterways, sewers, basements or confined areas.
Decontamination	No information available.
Environmental Precautionary Measures	Prevent entry into drains and waterways.
Evacuation Criteria	Spill or leak area should be isolated immediately. Evacuate personnel to safe areas. 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. Minimise dust generation and accumulation. Avoid breathing dust and contact with eyes, skin and clothing. Do not ingest. Use personal protective equipment as required (see SECTION 8). WARNING: May form combustible dust concentrations in air! Keep away from heat and sources of ignition - No smoking. Take precautionary measures against static discharges.
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 incompatible materials (see SECTION 10).
Container	Keep in the original container or in packaging made of an identical material to the original.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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General	No specific exposure standards are available for this product. For dusts from solid substances without specific occupational exposure standards: - Safe Work Australia Exposure Standard (Nuisance dusts): 8 hr TWA = 10 mg/m ³ (measured as inhalable dust). - New Zealand WES (Particulates not otherwise classified): TWA = 10 mg/m ³ ; TWA = 3 mg/m ³ (respirable dust).
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: In case of inadequate ventilation, wear respiratory protection. Recommended: Dust mask/particulate respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to avoid eye contact. Recommended: Safety glasses with side-shields. - Hand protection: Handle with gloves. Recommended: Impervious gloves, e.g. Neoprene, Nitrile rubber. - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: Overalls, safety shoes.
Special Hazards Precautions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Appearance	Granule or powder
Odour	No information available.
Colour	Light brown
pH	No Data Available
Vapour Pressure	Negligible (@ No Data Available)
Relative Vapour Density	No Data Available
Boiling Point	No Data Available
Melting Point	No Data Available
Freezing Point	No Data Available
Solubility	Partly soluble in water (Choline chloride)
Specific Gravity	No Data Available
Flash Point	No Data Available
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	No Data Available
Specific Heat	No Data Available
Molecular Weight	139.63 g/mol (Choline chloride)
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	Absorbs moisture (hygroscopic).
Potential for Dust Explosion	Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
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 solid; may burn but does not ignite readily.
Reactions That Release Gases or Vapours	Fire/decomposition may produce irritating, corrosive and/or toxic gases, including Carbon monoxide, Carbon dioxide, Nitrogen oxides and Hydrogen chloride gas.
Release of Invisible Flammable Vapours and Gases	No information available.

10. STABILITY AND REACTIVITY

General Information	No information available.
Chemical Stability	Stable under recommended storage conditions.
Conditions to Avoid	Avoid generating dust. Avoid moisture. Keep away from heat and sources of ignition.
Materials to Avoid	Incompatible/reactive with strong oxidising agents, strong acids, strong bases.
Hazardous Decomposition Products	Fire/decomposition may produce irritating, corrosive and/or toxic gases, including Carbon monoxide, Carbon dioxide, Nitrogen oxides and Hydrogen chloride gas.
Hazardous Polymerisation	Has not been reported.

11. TOXICOLOGICAL INFORMATION

General Information	<p>Information on toxicological effects:</p> <ul style="list-style-type: none"> - Acute toxicity: Not classified. Animal studies with choline chloride show a low acute toxicity after oral uptake. - Skin corrosion/irritation: Not classified. In rabbits, choline chloride may lead to a slight irritation of the skin, which is, however, not sufficient to warrant a classification of choline chloride as an irritant under GHS. - Serious eye damage/irritation: Not classified. In rabbits, choline chloride may lead to a slight irritation of the eye, which is, however, not sufficient to warrant a classification of choline chloride as an irritant under GHS. - Respiratory/skin sensitisation: Not classified. No data on sensitisation in animals are available. The skin sensitisation potential of choline chloride for humans is regarded as negligible. - Germ cell mutagenicity: Not classified. Choline chloride did not produce gene mutations, clastogenicity or DNA damage in in vitro mutagenicity studies; furthermore it has no structural alerts. Choline chloride does not have any genotoxic potential. - Carcinogenicity: No studies on carcinogenicity are available. - Reproductive toxicity: Not classified. No developmental toxic effects were observed in mice after oral doses of 1250 mg/kg bw/day on gestation days 1 to 18. Higher doses, above the levels recommended currently and associated with maternal toxicity, did produce developmental toxic effects, but these were secondary to the maternal toxicity at the excessive doses used. The compound does not produce any significant developmental toxicity in the mouse. - STOT (single exposure): No information available. - STOT (repeated exposure): Not classified. In a rat repeated dose study, using a single dose level of approximately 500
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mg/kg bw/day given over 72 weeks via feed, with a post-observation period of 30 weeks, no significant effects were observed relative to controls with respect to survival rates, body weights and relative liver weights. In humans, doses of 10 and 16 g choline chloride/day administered for 2 to 6 weeks, were associated with fishy body odour, vomiting, salivation, sweating. Gastrointestinal effects were reported in patients with tardive dyskinesia and cerebellar ataxia treated with choline chloride. Repeated oral administration of 10g/day in patients with Alzheimer's disease produced a slight hypertensive effect, but no other adverse effects.

- Aspiration toxicity: No information available.

Information on likely routes of exposure:

- Ingestion: May cause irritation of the digestive tract.
 - Eye contact: Dust contact with the eyes can lead to mechanical irritation.
 - Skin contact: Prolonged skin contact may cause irritation.
 - Inhalation: May cause respiratory tract irritation.
- Chronic effects: No information available.

Acute

Ingestion

Acute toxicity (Oral):
COMPONENT: Choline chloride (CAS No. 67-48-1):
- LD50, Mouse: 3,900 mg/kg [Supplier's SDS].
- LD50, Rat: 3,400 mg/kg [Supplier's SDS].

Carcinogen Category

None

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity:
- LC50, Fish (*Oryzias latipes*): >100 mg/l (96 h) [OECD 203].
- EC50, Crustacea (*Daphnia magna*): 349 mg/l (48 h) [OECD 202].
- ErC50, Algae/aquatic plants (*Pseudokirchneriella subcapitata*): >1,000 mg/l (72 h) [OECD 201].
- NOEC, Crustacea (*Daphnia magna*): 30.2 mg/l (21 d) [OECD 211].

Persistence/Degradability

Choline chloride was shown to be readily biodegradable according to OECD-criteria (93 % biodegradation within 14 days) in a MITI I-Test.

Mobility

No information available.

Environmental Fate

Prevent entry into drains and waterways.

Bioaccumulation Potential

No information available.

Environmental Impact

No Data Available

13. DISPOSAL CONSIDERATIONS

General Information

Dispose of contents/container in accordance with local/regional/national regulations.

Special Precautions for Land Fill

No information available.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG Code

Proper Shipping Name

Choline Chloride on Carrier

Class

No Data Available

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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 (Canada)

TDG Regulations

Proper Shipping Name	Choline Chloride on Carrier
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 (Malaysia)

ADR Code

Proper Shipping Name	Choline Chloride on Carrier
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	Choline Chloride on Carrier
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	Choline Chloride on Carrier
Class	No Data Available

SAFETY DATA SHEET CHOLINE CHLORIDE ON CARRIER REVISION 5, DATE 01 SEP 23

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	Choline Chloride on Carrier
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	Choline Chloride on Carrier
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)
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15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	Not Scheduled

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

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Approval Code Not Hazardous

National/Regional Inventories

Australia (AIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	200-655-4
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	CHCHLO1000, CHCHLO1001, CHCHLO1002, CHCHLO1003, CHCHLO1004, CHCHLO1005, CHCHLO1006, CHCHLO1007, CHCHLO1008, CHCHLO1009, CHCHLO1010, CHCHLO1011, CHCHLO1012, CHCHLO1013, CHCHLO1015, CHCHLO1019, CHCHLO1020, CHCHLO1024, CHCHLO1025, CHCHLO1100, CHCHLO1102, CHCHLO1103, CHCHLO1106, CHCHLO1107, CHCHLO1120, CHCHLO1130, CHCHLO1150, CHCHLO1200, CHCHLO1300, CHCHLO1500, CHCHLO1600, CHCHLO1700, CHCHLO1800, CHCHLO2100, CHCHLO2200, CHCHLO2201, CHCHLO2202, CHCHLO2400, CHCHLO2500, CHCHLO2501, CHCHLO2600, CHCHLO2601, CHCHLO2804, CHCHLO2806, CHCHLO2808, CHCHLO2900, CHCHLO3100, CHCHLO3200, CHCHLO3300, CHCHLO3400, CHCHLO3500, CHCHLO3501, CHCHLO3502, CHCHLO3600, CHCHLO3601, CHCHLO3602, CHCHLO3702, CHCHLO3800, CHCHLO3801, CHCHLO3900, CHCHLO4000, CHCHLO4300, CHCHLO4600, CHCHLO4900, CHCHLO5000, CHCHLO5001, CHCHLO5002, CHCHLO5003, CHCHLO5004, CHCHLO5005, CHCHLO5006, CHCHLO5007, CHCHLO5008, CHCHLO5009, CHCHLO5010, CHCHLO5011, CHCHLO5012, CHCHLO5013, CHCHLO5014, CHCHLO5015, CHCHLO5016, CHCHLO5017, CHCHLO5018, CHCHLO5019, CHCHLO5020, CHCHLO5021, CHCHLO5100, CHCHLO5700, CHCHLO6000, CHCHLO6001, CHCHLO6002, CHCHLO6003, CHCHLO6004, CHCHLO6005, CHCHLO6006, CHCHLO6100, CHCHLO6200, CHCHLO6600, CHCHLO7200, CHCHLO7800, CHCHLO8100, CHCHLO8300, CHCHLO8400, CHCHLO8700, CHCHLO8800, CHCHLO8900, CHCHLO9000, CHCHLO9300, CHCHLO9500, CHCHLO9700
Revision	5
Revision Date	01 Sep 2023
Key/Legend	< Less Than > Greater Than AICS Australian Inventory of Chemical Substances atm Atmosphere

CAS Chemical Abstracts Service (Registry Number)

cm² 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/cm³ 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/m³ 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

m³ Cubic Metre

mbar Millibar

mg Milligram

mg/24H Milligrams per 24 Hours

mg/kg Milligrams per Kilogram

mg/m³ 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