



SAFETY DATA SHEET

FORMIC ACID ($\geq 10\%$ BUT $\leq 85\%$)

REVISION 5, DATE 06 MAR 19

1. IDENTIFICATION

Product Name	Formic acid ($\geq 10\%$ but $\leq 85\%$)
Other Names	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Uses	Preservative; Antibacterial agent; Leather tanning; Dyeing and finishing textiles; Coagulant in rubber production; Cleaning products; Descaler; Chemical intermediate.
Chemical Family	No Data Available
Chemical Formula	CH ₂ O ₂
Chemical Name	Formic acid, aqueous solution
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 5

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

Phone +61 2 9733 3000
Fax +61 2 9733 3111
E-mail sydney@redox.com
Web www.redox.com
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 Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)

Hazard Categories

- Flammable Liquids - Category 4
- Corrosive to Metals - Category 1
- Acute Toxicity (Oral) - Category 4
- Acute Toxicity (Inhalation) - Category 3
- Skin Corrosion/Irritation - Category 1B
- Serious Eye Damage/Irritation - Category 1
- Specific Target Organ Toxicity (Single Exposure) - Category 3

Pictograms

Signal Word Danger

Hazard Statements

H227	Combustible liquid.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
AUH071	Corrosive to the respiratory tract

Precautionary Statements	Prevention	P280	Wear protective gloves/protective clothing/eye protection/face protection.	
		P233	Keep container tightly closed.	
		P260	Do not breathe mist/vapour/spray.	
		P270	Do not eat, drink or smoke when using this product.	
		P271	Use only outdoors or in a well-ventilated area.	
		P210	Keep away from flames and hot surfaces. No smoking.	
	Response	P370 + P378	In case of fire: Alcohol resistant foam is the preferred fire-fighting medium. However, if it is not available, fine water spray or water fog can be used to extinguish.	
		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.	
		P390	Absorb spillage to prevent material-damage.	
		P304 + P340	IF INHALED: Remove victim to fresh air and keep comfortable for breathing.	
		P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.	
		P363	Wash contaminated clothing before reuse.	
		Storage	P403 + P235	Store in a well-ventilated place. Keep cool.
			P406	Store in corrosive resistant container with a resistant inner liner.
	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
Formic acid	CH2O2	64-18-6	>=10 - <=85 %
Water	H2O	7732-18-5	Balance %

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

Swallowed	IF SWALLOWED: Rinse mouth, then drink 200 - 300 ml water. 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. Immediately call a Poison Centre or doctor/physician for advice. Remove contact lenses if present and easy to do. Continue rinsing for at least 15 minutes. Continue flushing until advised to stop by a Poisons Information Centre or a doctor, or for at least 15 minutes.
Skin	IF ON SKIN (or hair): Remove contaminated clothing and shoes immediately. Flush skin and hair with running water for at least 15 minutes. In case of gross contamination, drench contaminated clothing and skin with plenty of water before removing clothes. For minor skin contact, avoid spreading material onto unaffected skin. Immediately call a Poison Centre or doctor/physician for advice. 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. 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	Treat symptomatically. 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	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. Avoid getting water inside containers.
Flammability Conditions	Combustible liquid; May burn but does not ignite readily.
Extinguishing Media	Use dry chemical, Carbon dioxide (CO2), (alcohol-resistant) foam or water spray for extinction - Do not use water jets. Alcohol resistant foam is the preferred firefighting medium but, if it is not available, fine water spray can be used.
Fire and Explosion Hazard	Containers may explode when heated. When heated, vapours may form explosive mixtures with air. Contact with metals may evolve flammable hydrogen gas. Fire will produce irritating, toxic and/or corrosive gases, including Carbon monoxide.

Hazardous Products of Combustion

Special Fire Fighting Instructions	Contain runoff from fire control or dilution water - Runoff may be toxic and/or corrosive and may 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	65 - 69 °C
Lower Explosion Limit	15 %
Upper Explosion Limit	51 %
Auto Ignition Temperature	500 - 520 °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 - Slippery when spilt. Avoid accidents, clean up immediately. Do not breathe vapours and prevent contact with eyes, skin and clothing.
Clean Up Procedures	Absorb with earth, sand or other non-combustible material and transfer to suitable, 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	Neutralise residues with lime or soda ash. Wash area down with excess water.
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. Large spill: Consider initial downwind evacuation of areas within at least 250 m; Immediately contact Police or Fire Brigade.
Personal Precautionary Measures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (see SECTION 8). Large spill: Wear SCBA and chemical splash suit. Fully-encapsulating, gas-tight suits should be worn for maximum protection.

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 place. Handle in accordance with good industrial hygiene and safety practice. 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). Keep away from heat and sources of ignition - No smoking. Absorb spillage to prevent material damage (see SECTION 6).
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep container tightly closed - Check regularly for leaks. Keep cool; Keep away from heat and sources of ignition - No smoking. Keep away from food/feedstuffs and incompatible materials (see SECTION 10). Store locked up.
Container	Keep only in the original container or corrosive resistant container/container with a resistant inner liner.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	<p>COMPONENT: Formic acid (CAS No. 64-18-6):</p> <ul style="list-style-type: none"> - Safe Work Australia (SWA) Exposure Standard: TWA = 5 ppm (9.4 mg/m³); STEL = 10 ppm (19 mg/m³). - New Zealand Workplace Exposure Standard (WES): TWA = 5 ppm (9.4 mg/m³); STEL = 10 ppm (19 mg/m³). - NIOSH REL/OSHA PEL: TWA = 5 ppm (9 mg/m³). - Immediately dangerous to life or health (IDLH) concentration: 30 ppm.
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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: In case of inadequate ventilation, wear respiratory protection. Recommended: Any supplied-air respirator (up to 30 ppm) or any self-contained breathing apparatus (SCBA) with a full face-piece, operated in pressure-demand or other positive-pressure mode (refer to AS/NZS 1715 & 1716).- Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Chemical goggles; face-shield.- Hand protection: Wear protective gloves. Recommended: Elbow-length, impervious gloves.- Skin/body protection: Wear appropriate personal protective clothing to prevent skin contact. Recommended: Overalls, splash apron (or equivalent) and rubber boots.
Special Hazards Precautions	Vapour heavier than air - prevent concentration in hollows or sumps. Do NOT enter confined spaces where vapour may have collected.
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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Pungent, penetrating
Colour	Colourless
pH	<2 Neat
Vapour Pressure	~24 hPa (@ 20 °C)
Relative Vapour Density	~1.6 Air = 1
Boiling Point	101 - 107 °C
Melting Point	No Data Available
Freezing Point	No Data Available
Solubility	Miscible with water, alcohol, ether, glycerol
Specific Gravity	~1.2 (Water = 1)
Flash Point	65 - 69 °C
Auto Ignition Temp	500 - 520 °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 liquid; May burn but does not ignite readily. Reacts violently with oxidants and strong bases, causing fire and explosion hazard.
Reactions That Release Gases or Vapours	Fire/thermal decomposition will produce irritating, toxic and/or corrosive gases, including Carbon monoxide.
Release of Invisible Flammable Vapours and Gases	When heated, vapours may form explosive mixtures with air. Contact with metals may evolve flammable hydrogen gas.

10. STABILITY AND REACTIVITY

General Information	The substance is a medium-strong acid. Reacts violently with oxidants and strong bases, causing fire and explosion hazard. Attacks many plastics and metals.
Chemical Stability	Stable under normal storage and handling conditions.
Conditions to Avoid	Keep away from heat and sources of ignition.
Materials to Avoid	Incompatible/reactive with oxidising agents, alkalis, concentrated sulfuric acid, catalysts, metals (incl. aluminium, iron, steel).
Hazardous Decomposition Products	Fire/thermal decomposition will produce irritating, toxic and/or corrosive gases, including Carbon monoxide. Contact with metals may evolve flammable hydrogen gas.
Hazardous Polymerisation	No information available.

11. TOXICOLOGICAL INFORMATION

General Information	<ul style="list-style-type: none">- Acute toxicity: Harmful if swallowed; Corrosive to the gastrointestinal tract. Toxic if inhaled.- Skin corrosion/irritation: Corrosive to skin - Causes severe skin burns.- Eye damage/irritation: Corrosive to eyes - Causes serious eye damage.- Respiratory/skin sensitisation: Not considered to be a skin sensitiser.- Germ cell mutagenicity: Not considered to be genotoxic.- Carcinogenicity: No evidence of carcinogenicity.- Reproductive toxicity: No evidence of reproductive or developmental toxicity.- STOT (single exposure): Corrosive to the respiratory tract. Inhalation of the vapour may cause lung oedema.- STOT (repeated exposure): Repeated inhalation toxicity effects are primarily limited to irritant/corrosive effects (of the respiratory tract) and there is no significant evidence of systemic toxicity [NICNAS].- Aspiration toxicity: No information available.
Acute	
Ingestion	Acute toxicity (Oral): COMPONENT: Formic acid (CAS No. 64-18-6): - LD50, Rats: 730 mg/kg bw. [NICNAS].
Inhalation	Acute toxicity (Inhalation): COMPONENT: Formic acid (CAS. 64-18-6): - LC50, Rats: 7.4 mg/L (vapour) [NICNAS].
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: - LC50, Fish, freshwater: 130 mg/L [ECHA]. - EC50, Invertebrates, freshwater: 365 mg/L [ECHA].
Persistence/Degradability	This product is readily biodegradable.
Mobility	High mobility in soil.
Environmental Fate	Prevent entry into drains and waterways.
Bioaccumulation Potential	Does not bioaccumulate.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of contents/container through an approved agent and in accordance with local/regional/national regulations.
Special Precautions for Land Fill	Contaminated packaging: Empty containers, after decontamination, should be forwarded to an approved agent for recycling.

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

ADG Code

Proper Shipping Name	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	C1 Combustible Liquids - Flash Point $>60^{\circ}\text{C}$ - $\leq 93^{\circ}\text{C}$, Closed Cup
EPG	36 Toxic And/Or Corrosive Substances Combustible
UN Number	3412
Hazchem	•2X
Pack Group	II
Special Provision	No Data Available

Land Transport (Malaysia)

ADR Code

Proper Shipping Name	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	36 Toxic And/Or Corrosive Substances Combustible
UN Number	3412
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Land Transport (New Zealand)

NZS5433

Proper Shipping Name	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
EPG	36 Toxic And/Or Corrosive Substances Combustible
UN Number	3412
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Land Transport (United States of America)

US DOT

Proper Shipping Name	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
ERG	153 Substances - Toxic and/or Corrosive (Combustible)
UN Number	3412
Hazchem	2X
Pack Group	II
Special Provision	No Data Available

Sea Transport

IMDG Code

Proper Shipping Name	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	3412
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	FORMIC ACID with not less than 10% but not more than 85% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	3412
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**

FORMIC ACID (excluding its salts and derivatives) is listed in Schedule 5 of the SUSMP, except in preparations containing 0.5 % or less of formic acid.

Poisons Schedule (Aust)

Schedule 5

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

Approval Code

Additives Process Chemicals and Raw Materials Combustible Acutely Toxic Corrosive Group Standard 2020 HSR002511

National/Regional Inventories**Australia (AIC)**

Listed

Canada (DSL)

Not Determined

Canada (NDSL)

Not Determined

China (IECSC)

Not Determined

Europe (EINECS)

200-579-1

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**

FORMIC1052, FORMIC1054, FORMIC1055, FORMIC1057, FORMIC1381, FORMIC1784, FORMIC1829, FORMIC1830, FORMIC1831, FORMIC1834, FORMIC1840, FORMIC1841, FORMIC1844, FORMIC3070, FORMIC3082, FORMIC3083, FORMIC3084, FORMIC3089, FORMIC3170, FORMIC3184, FORMIC3640, FORMIC3670, FORMIC3671, FORMIC3682,

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FORMIC3683, FORMIC3684, FORMIC3686, FORMIC3687, FORMIC3691, FORMIC3694, FORMIC3696, FORMIC3697, FORMIC3698, FORMIC3770, FORMIC3773, FORMIC3775, FORMIC3784, FORMIC3785, FORMIC3880, FORMIC3890, FORMIC3900, FORMIC4000, FORMIC4001, FORMIC4002, FORMIC4003, FORMIC4004, FORMIC4500, FORMIC4600, FORMIC4700

Revision

5

Revision Date

06 Mar 2019

Reason for Issue

HSNO details updated 3/11/2016

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 Health 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

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ug/24H Micrograms per 24 Hours

UN United Nations

wt Weight