1. IDENTIFICATION

Product Name	**FORMIC ACID with not less than 10% but not more than 85% acid by mass**
Other Names	No Data Available
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	CH2O2
Chemical Name	Formic acid (>=10% but <=85%)
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Pty 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

Globally Harmonised System

Hazard Classification		Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)	
Hazard Categories		Corrosive to Metals - Category 1	
		Flammable Liquids - Category 4	
		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.
		H331	Toxic if inhaled.
		H314	Causes severe skin burns and eye damage.
		H335	May cause respiratory irritation.
Precautionary Statements	Prevention	**P210**	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
		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.
	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): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
		P310	Immediately call a POISON CENTER or doctor/physician.
		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 at rest in a position 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)

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

HSNO Classifications	Physical Hazards	**3.1D**	Flammable liquid - low hazard
	Health Hazards	**6.1C**	Substances that are acutely toxic- Toxic
		6.1D	Substances that are acutely toxic - Harmful
		6.1E	Substances that are acutely toxic –May be harmful, Aspiration hazard
		8.1A	Substances that are corrosive to metals
		8.2B	Substances that are corrosive to dermal tissue UN PGII
		8.3A	Substances that are corrosive to ocular tissue

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Water	H2O	7732-18-5	>15 - <=90 %
Formic Acid	No Data Available	64-18-6	>=10 - <85 %

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. 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 for at least 15 minutes. Immediately call a Poison Centre or doctor/physician. Keep victim calm and warm - Obtain immediate medical care.
Skin	IF ON SKIN (or hair): Remove contaminated clothing and shoes immediately and flush skin 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. Immediately call a Poison Centre or doctor/physician. For minor skin contact, avoid spreading material onto unaffected skin. Keep victim calm and warm - Obtain immediate medical care. 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. 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. Keep victim calm and warm - Obtain immediate medical care.
Advice to Doctor	Treat symptomatically. 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	When heated, vapours may form explosive mixtures with air. Containers may explode when heated. Contact with metals may evolve flammable hydrogen gas.
Hazardous Products of Combustion	Fire will produce irritating, toxic and/or corrosive gases, including Carbon monoxide.
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	Liquid-tight chemical protective clothing (splash-suit) in combination with self-contained breathing apparatus (SCBA) should be used.
Flash Point	>65 °C
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	>500 °C
Hazchem Code	•2X

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation - Ventilate enclosed spaces before entering. ELIMINATE all ignition sources (no smoking, flares, sparks or flames). Do not touch or walk through spilled material - Slippery when spilt. Do NOT breathe vapours - Prevent contact with eyes, skin and clothing.
Clean Up Procedures	Absorb with earth, sand or other non-combustible material and transfer to a suitable, labelled container 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.
Personal Precautionary Measures	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear self-contained breathing apparatus (SCBA) and chemical splash suit. Structural firefighter's uniform is NOT effective for this material.

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; Prevent contact with eyes, skin and clothing. Wear protective gloves/protective clothing/eye protection/face protection (see SECTION 8). Keep away from flames and hot surfaces - No smoking. Absorb spillage to prevent material damage.
Storage	Store in a cool, dry and well-ventilated place. Keep container tightly closed - Check regularly for leaks. Keep cool; Keep away from flames and hot surfaces - No smoking. Keep away from foodstuffs and incompatible materials (oxidising agents, alkalis). Store locked up.
Container	Keep in the original container or corrosive resistant container/container with a resistant inner liner.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	COMPONENT: Formic acid (CAS No. 64-18-6): - Safe Work Australia Exposure Standard: TWA = 5 ppm (9.5 mg/m3); STEL = 10 ppm (19 mg/m3). - New Zealand WES: TWA = 5 ppm (9.5 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.
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. Ensure ventilation is adequate that air concentrations of components are controlled below quoted workplace exposure standards.
Personal Protection Equipment	- Respiratory protection: In case of inadequate ventilation or inhalation exposure up to 30 ppm, wear an air-supplied respirator; For emergency or unknown concentrations, wear a self-contained breathing apparatus (SCBA). - 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 Precaustions	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. Wash thoroughly after handling. Remove contaminated clothing and shoes immediately and wash before storage or reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Pungent
Colour	Colourless
pH	<2 Neat
Vapour Pressure	~35 mmHg (@ 20 °C)
Relative Vapour Density	~1.6 Air = 1
Boiling Point	~101 °C
Melting Point	No Data Available
Freezing Point	~8.4 °C
Solubility	Miscible with water, alcohol, ether, glycerol
Specific Gravity	~1.22
Flash Point	>65 °C
Auto Ignition Temp	>500 °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.
Chemical Stability	Stable under normal conditions of storage and handling.
Conditions to Avoid	Keep away from heat and sources of ignition.
Materials to Avoid	Incompatible/reactive with oxidising agents, alkalis, concentrated sulfuric acid, catalysts. Attacks may plastics and 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

- 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: No 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): Causes respiratory irritation; May be corrosive to the respiratory tract.
- STOT (repeated exposure): Repeated inhalation effects are primarily limited to irritant effects (of the respiratory tract) and there is no significant evidence of systemic toxicity for repeated dose inhalation toxicity.
- Aspiration toxicity: No information available.

Acute

Ingestion

Acute toxicity (Oral):
COMPONENT: Formic acid (CAS No. 64-18-6):
- LD50, Rats: 730 mg/kg bw.

Inhalation

Acute toxicity (Inhalation):
COMPONENT: Formic acid (CAS. 64-18-6):
- LC50, Rats: 7.4 mg/L (vapour).

Carcinogen Category

None

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity:
- LC50, Fish: 130 mg/L (96 h) [OECD 203].
- LC50, Daphnia: 365 mg/L (48 h) [OECD 202].
- EC50, Algae: 1,000 mg/L (72 h) [OECD 201].

Persistence/Degradability	Considered to be readily biodegradable.
Mobility	Not information available.
Environmental Fate	Prevent entry into drains and waterways.
Bioaccumulation Potential	Not bioaccumulative.
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°C - <=93°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	No Data Available
Poisons Schedule (Aust)	Schedule 5

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

Approval Code	HSR002511

National/Regional Inventories

Australia (AICS)	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, FORMIC1381, FORMIC1784, FORMIC1829, FORMIC1830, FORMIC1831, FORMIC1834, FORMIC1840, FORMIC1841, FORMIC3070, FORMIC3082, FORMIC3083, FORMIC3084, FORMIC3089, FORMIC3170, FORMIC3184, FORMIC3640, FORMIC3670, FORMIC3671, FORMIC3682, FORMIC3683, FORMIC3684, FORMIC3686, FORMIC3687, FORMIC3691, FORMIC3694, FORMIC3696, FORMIC3770, FORMIC3775, FORMIC3784, FORMIC3880, FORMIC3890, FORMIC3900, FORMIC4000, FORMIC4001, FORMIC4002, FORMIC4003, FORMIC4004, FORMIC4500, FORMIC4600, FORMIC4700
Revision	4
Revision Date	17 Dec 2014
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 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