SAFETY DATA SHEET
FORMIC ACID 10%
REVISION 2, DATE 21 JAN 20

1. IDENTIFICATION

Product Name	**Formic Acid 10%**
Other Names	No Data Available
Uses	Dying & finishing of textiles & paper; Leather treatment; chemical synthesis; manufacture of fumigants, refrigerants, solvents for perfume, lacquers; electo-plating; medicine; brewing; silvering glass; cellulose formate; natural latex, coagulant; ore floatation; vinyl resin plasticiser.
Chemical Family	No Data Available
Chemical Formula	CH2O2
Chemical Name	Formic Acid 10%
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

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 5

Skin Corrosion/Irritation - Category 1B

Serious Eye Damage/Irritation - Category 1

Pictograms

Signal Word Danger

Hazard Statements		**H303**	May be harmful if swallowed.
		H314	Causes severe skin burns and eye damage.
Precautionary Statements	Prevention	**P260**	Do not breathe mist/vapour/spray.
		P280	Wear protective gloves/protective clothing/eye protection/face protection.
	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.
		P304 + P340	IF INHALED: Remove victim to fresh air and keep comfortable for breathing.
	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)

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

HSNO Classifications	Health Hazards	**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
Formic acid	CH2O2	64-18-6	9.5 - 10.5 %
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 plenty of 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. 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.

Skin IF ON SKIN (or hair): Remove contaminated clothing and shoes immediately. Flush skin and hair with running water for at least 15 minutes. Immediately call a Poison Centre or doctor/physician for advice. For minor skin contact, avoid spreading material on unaffected skin. Wash contaminated clothing and shoes before reuse.
*May not produce an immediate burning sensation upon contact, delaying the awareness that contact has occurred.

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. Show this safety data sheet to the doctor in attendance.

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 Non-combustible (aqueous solution); However, after evaporation of the aqueous component, residual material can burn if ignited.

Extinguishing Media If material is involved in a fire, 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.

Hazardous Products of Combustion Fire or heat will produce irritating, toxic and/or corrosive gases, including Carbon oxides.

Special Fire Fighting Instructions Contain runoff from fire control or dilution water - Runoff may be toxic and/or corrosive an 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 No Data Available

Lower Explosion Limit No Data Available

Upper Explosion Limit No Data Available

Auto Ignition Temperature No Data Available

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 - Spillages are slippery. 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, closed containers for disposal (see SECTION 13).
Containment	Stop leak if safe to do so – Prevent entry into waterways, drains or confined areas. Cover with plastic sheet to prevent spreading.
Decontamination	Cautiously neutralise with weak alkaline solution, such as disodium carbonate. Then wash away with plenty of 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: Immediately contact Police or Fire Brigade; Consider initial downwind evacuation of areas within at least 250 m.
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. Do not use in confined spaces. Handle in accordance with good industrial hygiene and safety practice. Build up of mists or vapours in the atmosphere must be prevented. 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). Do not use near heat, sparks, open flames and other ignition sources - No smoking.
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep containers closed when not in use - check regularly for leaks or spills. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep away from heat and sources of ignition - No smoking. Keep away from foodstuffs and incompatible materials (see SECTION 10). Do not combine part drums of the same product, as this may be a source of contamination. Do not mix with other chemicals. Store locked up.
Container	Keep in the original container. Do not pressurise, cut, heat or weld containers as they may contain hazardous residues.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	For Formic acid (CAS No. 64-18-6): - Safe Work Australia Exposure Standard: TWA = 5 ppm (9.4 mg/m3); STEL = 10 ppm (19 mg/m3). - New Zealand Workplace Exposure Standard: 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.
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: Full-face respirator with multi-purpose combination or type ABEK respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Safety glasses/goggles

	with side shield protection and/or full-face shield. - Hand protection: Wear protective gloves. Recommended: Laminate film, elbow-length supported or unsupported neoprene, neoprene/latex blend or PVC impervious gloves. - Skin/body protection: Wear appropriate personal protective clothing to prevent skin contact. Recommended: waterproof apron, coveralls, trousers, long sleeved shirt, closed in shoes and/or safety footwear.
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 hands before breaks and at the end of workday. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Pungent
Colour	Colourless
pH	1.7
Vapour Pressure	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	Miscible with water
Specific Gravity	1.01 - 1.03
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	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	Non-combustible (aqueous solution); However, after evaporation of the aqueous component, residual material can burn if ignited.
Reactions That Release Gases or Vapours	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides.
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. This generates fire and explosion hazard. Attacks many plastics and metals.
Chemical Stability	Stable under recommended storage conditions.
Conditions to Avoid	Avoid exposure to heat, sparks, open flames and other ignition sources.
Materials to Avoid	Incompatible/reactive with strong oxidising agents, strong bases, powdered metals.
Hazardous Decomposition Products	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides.
Hazardous Polymerisation	No information available.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: May be harmful if swallowed. Corrosive on ingestion. Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract. COMPONENT: Formic acid (CAS 64-18-6) is Harmful if swallowed & Toxic if inhaled.
- Skin corrosion/irritation: Causes severe skin burns. Corrosive to skin - may cause skin burns. May not produce an immediate burning sensation upon contact, delaying the awareness that contact has occurred. Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage.
- Eye damage/irritation: Causes serious eye damage. Corrosive to eyes and may injure the cornea. Contamination of eyes can result in permanent injury. Symptoms include stinging, tearing, redness and swelling of eyes.
- Respiratory/skin sensitisation: The chemical was not shown to be a skin sensitiser in a Buehler study [NICNAS].
- Germ cell mutagenicity: Formic acid is not considered to be genotoxic.
- Carcinogenicity: No evidence of increased carcinogenicity (Analogue: potassium hydrogen diformate).
- Reproductive toxicity: No adverse effects on reproductive organs; no effects on the developing foetuses (Analogues: potassium hydrogen diformate & sodium formate).
- STOT (single exposure): Breathing in mists or aerosols may produce respiratory irritation. COMPONENT: Formic acid (CAS 64-18-6) May cause respiratory irritation.
- STOT (repeated exposure): 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 No. 64-18-6): - LC50, Rats: 7.4 mg/L vapour (4 h) [NICNAS].
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Acute values for marine organisms are available indicating a low hazard potential. Formic acid is considered acutely not harmful for aquatic organisms.
Persistence/Degradability	Formic acid and the formate ion are readily biodegradable.
Mobility	For the undissociated formic acid as well as for the dissociated form (formate ion), significant adsorption to solid soil phase (e.g. clay) is not expected. From the water surface, the substance will not evaporate into the atmosphere.
Environmental Fate	The product is highly acidic. If large spills occurred, a water pH drop could be responsible for an environmental effect on aquatic organisms.
Bioaccumulation Potential	Accumulation in organisms is not to be expected.
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	The product is suitable for disposal by landfill through an approved agent. Incineration of the product is not recommended, as the by-products may be hazardous.

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)	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 (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 5% but less than 10% acid by mass
Class	8 Corrosive Substances
Subsidiary Risk(s)	No Data Available
UN Number	3412
Hazchem	•2X
Pack Group	III
Special Provision	No Data Available
Comments	Not to be loaded with Explosives (Class 1), Dangerous when wet substances (class 4.3), Oxidizing substances (Class 5.1), Organic peroxides (Class 5.2), Toxic substances (Class 6) when the substance is a cyanide compound, Radioactive material (Class 7), Corrosives (strong alkalis of class 8), Food or food empties, however exemptions may apply.

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
Poisons Schedule (Aust)	Schedule 5

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

Approval Code	HSR002491

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	200-579-1
Europe (REACh)	01-2119491174-37-
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	FORMIC1802, FORMIC1832, FORMIC1833, FORMIC1836, FORMIC1837, FORMIC1838, FORMIC1839, FORMIC1842,

	FORMIC1843, FORMIC8600
Revision	2
Revision Date	21 Jan 2020
Reason for Issue	New SDS
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