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MATERIAL SAFETY DATA SHEET

FORMID ACID

1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS Name : Formic acid

Synonyms : Ethanoic acid; Ethylic acid; Methane carboxylic Acid, Vinegar acid.

Company Identification : Tradeasia International Pte Limited

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2 COMPOSITION AND INFORMATION ON INGREDIENTS

CAS#	Chemical Name	% by Weight
64-18-6	Formic acid	85+

3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance: colorless clear liquid. Flash Point: 50^{0}C.

Danger: Combustible liquid and vapor. Causes burns by all exposure routes. Hygroscopic (absorbs moisture from the air).

4 FIRST AID MEASURES

Target Organs : Respiratory system, gastrointestinal system, eyes, skin.

Potential Health Effects

Eye : Causes severe eye burns. May cause conjunctivitis. Lachrymator (substance which increases the flow of tears).

Skin : May be harmful if absorbed through the skin. Causes severe burns.

Ingestion : May be harmful if swallowed. Causes severe digestive tract burns.

Inhalation : Causes chemical burns to the respiratory tract. May be harmful if inhaled.

Chronic : Chronic absorption of formic acid may cause damage to the kidneys, which is indicated by albuminuria and haematuria. Chronic skin contact may cause sensitization dermatitis, particularly in workers previously sensitized to formaldehyde.

Eyes : Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin : Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion : Do not induce vomiting. Get medical aid immediately. Call a poison control centre.

Inhalation : Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Notes to Physician : Treat symptomatically and supportively.

5 FIRE AND EXPLOSION DATA

General Information : As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Will burn if involved in a fire. Combustible liquid and vapor.

Extinguishing Media : Use foam, dry chemical, or carbon dioxide.

Flash Point : 50^{0}C (122.00 F)

Auto ignition Temperature : 520^{0}C (968.00 deg F)

Explosion Limits, Lower : 10 vol %

Upper : 45 vol %

NFPA Rating : (estimated) Health: 3; Flammability: 2; Instability: 1

6 ACCIDENTAL RELEASE MEASURES

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks : Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

7 HANDLING AND STORAGE

Handling : Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Keep away from heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood.

Storage : Keep away from sources of ignition. Store in a tightly closed container. Store in a dry area. Corrosives area. Keep refrigerated. (Store below 4^{0}C.) Do not store in metal containers. Concentrated formic acid will slowly decompose to carbon monoxide at room temperature resulting in increased pressure if containers are sealed or unvented.

8 EXPOSURE CONTROLS/ PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Formic acid	5 ppm TWA; 10 ppm STEL	5 ppm TWA; 9 mg/m3 TWA 30 ppm IDLH	5 ppm TWA; 9 mg/m3 TWA
Water	none listed	none listed	none listed

OSHA Vacated PELs : Formic acid: 5 ppm TWA; 9 mg/m3 TWA Water: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes : Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin : Wear appropriate protective gloves to prevent skin exposure.

Clothing : Wear appropriate protective clothing to prevent skin exposure.

Respirators : A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace

9 PHYSICAL AND CHEMICAL PROPERTIES

Physical State	: Clear liquid
Appearance	: colorless
Odor	: pungent odor
pH	: 2.1 (10 g/L aq.sol.)
Vapor Pressure	: 44 mbar @ 20^0C
Vapor Density: 1.6 (air=1)	
Evaporation Rate	: 2.1 (Butyl Acetate=1)
Viscosity	: 1.47 mPa @ 20^0C
Boiling Point	: 101^0C @ 760 mmHg
Freezing/Melting Point	: 8^0C
Decomposition Temperature	: Not available.
Solubility	: Miscible.
Specific Gravity/Density	: 1.220
Molecular Formula	: CH_2O_2
Molecular Weight	:46.02

10 STABILITY AND REACTIVITY DATA

Chemical Stability : Hygroscopic: absorbs moisture or water from the air. Keep Refrigerated. Formic acid may decompose to carbon Monoxide and water or carbon dioxide and hydrogen gas. These decomposition products develop pressure. Heat Sensitive.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat, exposure to moist air or water.

Incompatibilities with Other Materials: Metals, strong oxidizing agents, strong bases, permanganates, sulfuric acid, hydrogen peroxide, caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), nitro

compounds (organic, e.g. nitrobenzene, nitroglycerine, picric acid, trinitrotoluene).

Hazardous Decomposition Products : Carbon monoxide, carbon dioxide, hydrogen gas.

Hazardous Polymerization : Will not occur.

11 TOXICOLOGICAL INFORMATION

RTECS#:

CAS# 64-18-6 : LQ4900000

CAS# 7732-18-5 : ZC0110000

LD50/LC50:

CAS# 64-18-6:

Draize test, rabbit, eye : 122 mg Severe;

Inhalation, mouse : LC50 = 6200 mg/m3/15M;

Inhalation, rat : LC50 = 15 gm/m3/15M;

Oral, mouse : LD50 = 700 mg/kg;

Oral, rat : LD50 = 1100 mg/kg;

CAS# 7732-18-5:

Oral, rat : LD50 = >90 mL/kg;

Carcinogenicity:

CAS# 64-18-6 : Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 7732-18-5 : Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology : No information found

Teratogenicity : No information found

Reproductive Effects : No information found

Mutagenicity : Sister Chromatid Exchange: Human, Lymphocyte = 10 mmol/L.; Cytogenetic Analysis: Non-mammalian species

Cells - not otherwise specified = 100 mmol/L.;
Cytogenetic Analysis: Hammster, Ovary = 10 mmol/L.

Neurotoxicity : No information found

12 ECOLOGICAL INFORMATION

Ecotoxicity : Fish: Bluegill/Sunfish: LC50 = 5000 mg/L; 24 Hr; Unspecified Water flea Daphnia: EC50 = 34 mg/L; 48 Hr; Unspecified In natural water it has been shown to adsorb to sediment and would probably also biodegrade. Bio concentration in aquatic organisms is not important. In the atmosphere, formic acid would be scavenged by rain and dissolve in cloud water where it reacts with dissolved hydroxyl radicals. It also reacts in the vapor phase with hydroxyl radicals (half-life 36 days).

Environmental : Formic acid is the strongest unsubstituted carboxylic acid with a pKa of 3.74(3) and will exist almost entirely as the anion at environmental pHs. If released on land, formic acid should leach into some soils where it would probably biodegrade.

Physical : Formic acid can be degraded chemically to innocuous substances in most environments.

Other : Do not empty into drains.

13 DISPOSAL CONSIDERATIONS

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series : None listed.

RCRA U-Series:

CAS# 64-18-6 : waste number U123 (Corrosive waste, Toxic waste).

14 TRANSPORT INFORMATION

	US DOT	Canada TDG
Shipping Name:	FORMIC ACID	FORMIC ACID
Hazard Class:	8	8
UN Number:	UN1779	UN1779
Packing Group:	II	II

15 OTHER REGULATORY INFORMATION

US FEDERAL

TSCA

CAS# 64-18-6 is listed on the TSCA inventory.

CAS# 7732-18-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 64-18-6: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 64-18-6: immediate, fire.

Section 313

This material contains Formic acid (CAS# 64-18-6, 85+ %), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 64-18-6 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labelling in Accordance with EC Directives

Hazard Symbols: C

Risk Phrases:

R 35 Causes severe burns.

Safety Phrases:

S 23 do not inhale gas/fumes/vapour/spray.

S 26 In case of contact with eyes rinse immediately with plenty of water and seek medical advice.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 64-18-6: 1

CAS# 7732-18-5: No information available.

Canada - DSL/NDSL

CAS# 64-18-6 is listed on Canada's DSL List.

CAS# 7732-18-5 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E, B3.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 64-18-6 is listed on the Canadian Ingredient Disclosure List.