CALEDON LABORATORY CHEMICALS

MATERIAL SAFETY DATA SHEET

FORMIC ACID

PRODUCT IDENTIFICATION

Chemical Name and Synonyms:
Formic acid; Methanoic acid; Aminic acid
Chemical Family:
Saturated aliphatic carboxylic acid
Chemical Formula:
CHOOH
Product Use:
Laboratory reagent
Manufacturer's Name and Address:
Caledon Laboratories Ltd.
40 Armstrong Avenue
Georgetown, Ontario L7G 4R9
Telephone No:
(905) 877-0101
Fax No:
(905) 877-6666
Emergency Telephone No:
CANUTEC (613) 996-6666

HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	*%*	*TLV Units*	*CAS No.*
Methanoic acid	*~88*	*9 mg/m^3*	*64-18-6*

PHYSICAL DATA

Physical State:
Liquid
Odour and Appearance:
Colourless liquid, may fume; intense, penetrating, pungent odour
Odour Threshold (ppm):
13 to 340 ppm (detection); 11-13 ppm, recognition; poor warning properties, odour threshold above TLV
Vapour Pressure (mm Hg):
35 mm Hg at 20°C
Vapour Density (Air = 1):
1.59
Evaporation Rate:
2.1 (n-butyl acetate = 1)
Boiling Point (degrees C):
105°C (90%)
Freezing Point (degrees C):
-6.7 to -5°C (90%)
pH:
2.38 (0.1M)
Specific Gravity:
1.204 (90%) @ 20°C
Coefficient of Water/Oil distribution:
Log P(oct)=-0.54

SHIPPING DESCRIPTION

UN:
1779
T.D.G. Class:
8
Pkg. Group:
II

REACTIVITY DATA

Chemical Stability:
Moderately stable. Decomposes slowly to produce carbon monoxide. Pure liquid is hygroscopic, absorbs moisture from air.
Incompatibility with other substances:
Reacts violently with strong bases, strong acids (producing heat and gas), aluminum. Reacts violently and explosively with strong oxidizers, furfurly alcohol, hydrogen peroxide. Catalysts (palladium-carbon, nickel) or finely powdered metals may cause decomposition with release of flammable/explosive hydrogen gas. Mixtures with nitromethane may explode if shocked. Violent reaction occurred when a small amount of vanillin was added to thallium nitrate trihydrate in 90% formic acid. Corrosive to lead, aluminum, cast iron, cast steel. Does not corrode stainless steel, certain alloys of steel. Attacks some forms of plastics (polyamides). Polyethylene and polypropylene can be used to store 85% formic acid at low temperatures. Polyfluoroethylene is resistant to formic acid.
Reactivity:
Avoid excessive heat, ignition sources, all incompatible materials, generation of mist.
Hazardous Decomposition Products:
CO

FIRE AND EXPLOSION DATA

Flammability:
Combustible liquid and vapour. Must be exposed to relatively high temperatures to ignite. Can form combustible mixtures with air at or above 46.5°C. Reacts with some metals to release flammable/explosive hydrogen gas. Vapour is heavier than air and may collect in low-lying areas. Vapours from heated liquid can accumulate, resulting in explosion and toxicity hazard. Closed containers may rupture violently when heated.
Extinguishing Media:
Carbon dioxide, dry chemical, alcohol or polymer foam, water spray. Use water as a spray or fog to cool fire-exposed containers, to disperse vapours, to dilute spills to non-flammable mixtures, to flush spills away and limit exposures. Firefighters must wear protective equipment (self-contained breathing apparatus)and clothing (encapsulating chemical-resistant splash suit)sufficient to prevent inhalation of vapours and contact with skin and eyes. Fight fire from a distance, from upwind or use unmanned equipment.
Flash Point (Method Used):
58°C (90%) (CC)
Autoignition Temperature:
539°C; 434°C (90%)
Upper Flammable Limit (% by volume):
57 (90%)
Lower Flammable Limit (% by volume):
18 (90%)
Hazardous Combustion Products:
<150°C, carbon monoxide; >150°C, CO_2 and hydrogen gas; >300°C, formaldehyde.
Sensitivity to Impact:
Probably not sensitive
Sensitivity to Static discharge:
No specific information available. Will not accumulate static charge, electrical conductivity is high.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:
LD_{50}:
(oral, rat) 1,100 mg/kg; (oral, mouse) 700 mg/kg
LC_{50}:
(rat) 2000 ppm/4h; (mouse) 6,200 mg/m^3/15min
Effects of Acute Exposure to Product:
Inhaled:

Corrosive and irritating. Readily forms high vapour concentrations; therefore serious inhalation hazard. Mist or vapour (15 ppm) causes severe irritation with nasal discharge, coughing and difficulty in breathing. May cause damage to nasal and respiratory passages, possible pulmonary edema, shock and death. Symptoms of pulmonary edema (shortness of breath, cyanosis) may not appear until several hours after exposure. Inhalation of smaller amounts (2-4 ppm) can cause reversible kidney effects (increased ammonia and calcium in the urine).

In contact with skin:

Corrosive. Liquid can cause cause severe burns with piercing pain, reddening and tissue destruction which is slow to heal, and may cause permanent scarring. Skin damage depends on concentration and duration of exposure.

In contact with eyes:

Corrosive. Liquid and vapour cause severe irritation. Liquid, mist or spray, concentrated or dilute, may cause severe burns, irreversible corneal damage, and blindness.

Ingested:

Corrosive. Very destructive to tissue. May cause burning, ulceration and perforation of gastrointestinal tract. Symptoms include burning sensation, agonizing pain, bloody diarrhea, shock, rapid pulse, low blood pressure, difficult breathing, kidney damage and death. Estimated lethal does for humans in 30 mL. Aspiration into the lungs during ingestion or subsequent vomiting may cause severe damage to lung tissue, pulmonary edema, and death.

Effects of Chronic Exposure to Product:

Carcinogenicity:

Not listed as a carcinogen by NTP, IARC, or OSHA

Teratogenicity:

No human or animal information available.

Reproductive Effects:

No human or animal information available.

Mutagenicity:

No human or mammalian in vivo information available. Mixed results in short-term in vitro testing.

Synergistic Products:

None known

PREVENTIVE MEASURES

Engineering Controls:

Local non-sparking, grounded, corrosion-resistant exhaust ventilation, separated from other exhaust systems.

Respiratory Protection:

Use only in a fume hood. Up to 30 ppm: NIOSH approved supplied-air respirator or full face-piece self-contained breathing apparatus. Higher or unknown concentrations, as in fire or spill conditions: positive pressure, full face-piece self-contained breathing apparatus, or positive pressure, full face-piece supplied-air respirator with an auxiliary positive pressure self-contained breathing apparatus.

Eye Protection:

Chemical safety goggles and face shield.

Skin Protection:

Butyl rubber, neoprene rubber, Viton™/butyl rubber, Barrier (PE/PA/PE), Responder™, Trellchem™HPS, Tychem™BR/LV, Tychem™SL, Tychem™ TK gloves. Other chemical resistant protective clothing, gloves, coveralls, boots, as required to prevent any contact.

Other Personal Protective Equipment:

Safety shower and eye-wash fountain in work area.

Leak and Spill Procedure:

Evacuate area. Eliminate all ignition sources. Cleanup personnel must be thoroughly trained in the hazards of this chemical and must wear protective equipment and clothing sufficient to prevent inhalation of mists or vapours and contact with skin and eyes. DO NOT TOUCH SPILLED MATERIAL. Prevent from entering sewers or waterways. Stop or reduce leak if it is safe to do so. Absorb on inert absorbent. Transfer carefully into container and arrange removal by disposal company. Contaminated adsorbent may pose the same hazards as the spilled product. Wash site of spillage thoroughly with water and detergent. Ventilate area to dispel residual vapour.

Waste Disposal:

Follow all federal, provincial and local regulations for disposal.

Handling Procedures and Equipment:

CORROSIVE, COMBUSTIBLE, TOXIC. Personnel working with this product must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Keep away from all sources of ignition. Avoid release of vapours or mists; open containers with extreme caution, build-up of gas in unvented container may cause explosion or eruption of product. Do not open container if it is of unknown age. Avoid generating mist. Avoid all contact. Avoid temperatures above 35°C. Use the smallest possible amounts in designated areas with adequate ventilation. Treat empty containers with caution; they may contain hazardous residues or gases, or may have a build-up of gas pressure.

Storage Requirements:

Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight. Store away from incompatible materials, such as oxidizing materials, strong acids or strong bases. Store in containers with vented closures. Keep containers tightly closed when not in use and when empty, but vent periodically to prevent bursting. Inspect frequently for signs of damage or increasing pressure. Protect from freezing (store above 8°C). Storage area should be separated from work areas, and should be equipped with corrosion-resistant structural materials, and lighting and ventilation systems.

FIRST AID MEASURES

Specific Measures:

Eyes:

IMMEDIATELY FLUSH EYES with warm running water for at least sixty (60) minutes, holding eyelids open during flushing. Wear gloves to avoid contact during first aid procedures. Take care not to flush contaminated water into the unaffected eye. Get medical attention immediately (flushing may be continued while casualty is transported to medical facility).

Skin:

Remove contaminated clothing (including rings, watches, belts and shoes). Wear protective clothing (impervious gloves, etc.) to avoid any contact with the chemical. IMMEDIATELY flush exposed area with large amounts of warm running water for at least twenty (20) minutes. Get medical attention immediately. Decontaminate all clothing before reuse, or discard.

Inhalation:

IMMEDIATELY remove to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes; use buddy system - do not attempt rescue alone). IMMEDIATELY OBTAIN MEDICAL ATTENTION. Stay with casualty until medical assistance is reached. Give oxygen for breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent give CPR. Symptoms of pulmonary edema (shortness of breath, cyanosis) may not appear until several hours after exposure; get medical attention

immediately if symptoms develop.

Ingestion:

DO NOT INDUCE VOMITING. DANGER OF ASPIRATION WITH VOMITING. If casualty is alert and not convulsing, rinse out mouth with water. Give milk of magnesia or 1 to 2 glasses of water or milk to dilute material. IMMEDIATELY GET MEDICAL ATTENTION. If spontaneous vomiting occurs, have casualty lean forward with head down to avoid breathing in of vomitus. Give oxygen for breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent give CPR.

REFERENCES USED

CCINFO disc: Cheminfo
Budavari: The Merck Index, 12th ed., 1997
Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987
Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 3, 1990
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued:

February 20, 1990

Revision:

June 2012

MSDS:

3840-1, 3841-1

Proposed WHMIS Designation:

B3; E (insufficient information for toxicity classification)