CALEDON LABORATORY CHEMICALS

MATERIAL SAFETY DATA SHEET

ACETIC ANHYDRIDE

PRODUCT CODE NUMBER(S): 1100-1

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: *Acetic anhydride; Acetic acid anhydride; Ethanoic anhydride; Acetyl oxide; Acetyl ether*

Chemical Family: *Saturated aliphatic carboxylic acid anhydride*

Chemical Formula: *$(CH_3CO)_2O$*

Product Use: *Laboratory chemical*

Manufacturer's Name and Address:

Caledon Laboratories Ltd.
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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	*%*	*TLV Units*	*CAS No.*
Acetic anhydride	*>99*	*5 ppm*	*108-24-7*

PHYSICAL DATA

Physical State: *Liquid*

Odour and Appearance: *Clear, colourless, mobile liquid with pungent vinegar-like odour*

Odour Threshold (ppm): *0.14 ppm (detectionj), 0.36 ppm (recognition). Good warning properites; strong odour, and severe irritant.*

Vapour Pressure (mm Hg): *3.0 mm Hg @ 20°C*

Vapour Density (Air = 1): *3.52*

Evaporation Rate: *0.46 (butyl acetate = 1)*

Boiling Point (°C): *139°C*

Freezing Point (°C): *-73°C*

pH: *Not applicable. Reacts with water to form strongly acidic solutions*

Specific Gravity: *1.082 @ 20°C*

Coefficient of Water/Oil distribution: *Not applicable (reacts)*

SHIPPING DESCRIPTION

UN: *1715*

T.D.G. Class: *8; (3)*

Pkg. Group: *II*

REACTIVITY DATA

Chemical Stability: *Stable, if uncontaminated. Reacts with water or water vapour to form acetic acid and heat; reaction may become violent over time.*

Incompatibility with other substances: *Decomposes to acetic acid if heated. Hydrolyses rapidly and violently with acids or oxiziders, with rise in temperature and pressure and risk of explosion. Reacts with water to form acetic acid, which catalyses further hydrolysis, causing explosive boiling. Can react violently or explosively with bases, reducing agents, oxidizers, metal nitrites, nitrogen tetroxide, peroxyacetic acid. Can detonate if mixed with nitric acid. Can corrode chromium-containingstainless steels, nickel and aluminum alloys. Attacks many plastics, rubber, and coatings.*

Reactivity: *Avoid moisture, heat, sparks, open flames and all ignition sources, generation of mist or vapour, all incompatible materials.*

Hazardous Decomposition Products: *Acetic acid, toxic, irritating fumes*

FIRE AND EXPLOSION DATA

Flammability: *Combustible liquid. Can form explosive mixtures with air at, or above 52°C. Vapours from warmed liquid can accumulate in confined spaces, resulting in a explosion and toxicity hazard. Water reacts slowly with acetic anhydride at normal temperatures, but more rapidly and violently under fire conditions to form acetic acid and give off heat. Closed containers may rupture violently in heat of fire.*

Extinguishing Media: *CO_2, dry chemicals, alcohol or polymer foam. Water spray will extinguish the fire, but must be in flooding quantities to dissolve the anhydride and fully absorb the heat. Large amounts of water should be used to dilute material that is not burning, to cool containers, and to flush spill away from ignition sources. Do not get water into containers. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment (positive-pressure, full face-piece self-contained breathing apparatus) and chemical splash suit.*

Flash Point (Method Used): *52°C (TCC)*

Autoignition Temperature: *Reported values vary: 316-390°C*

Upper Flammable Limit (% by volume): *10.3*

Lower Flammable Limit (% by volume): *2.7*

Hazardous Combustion Products: *Acetic acid, toxic, irritating fumes, acrid smoke, CO_x*

Sensitivity to Impact: *None identified*

Sensitivity to Static discharge: *Will probably not accumulate static charge by flow or agitation; relatively high electrical conductivity.*

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:

LD_{50}: *(oral, rat) 1,780 mg/kg; (dermal, rabbit) 4 mL/kg*

LC_{50}: *(rat) 1,000 ppm/4h*

Effects of Acute Exposure to Product:

Inhaled: *VERY TOXIC. Corrosive. May be fatal if inhaled. Vapour concentrations above 5 ppm cause irritation of nose and throat. High concentrations are extremely irritating, causing choking, wheezing. Prolonged exposures can cause corrosive damage to nose and throat, severe lung damage. Inhalation may be fatal due to spasm, inflammation and edema of the larynx and bronchi. Symptoms, coughing, shortness of breath, and labored breathing, foamy sputum, may be delayed several hours. Reactive Airways Dysfunction (RADS), increased sensitivity of the airways (similar to asthma) may develop following a severe inhalation exposure.*

In contact with skin: *Corrosive. No human information available, but liquid or vapour would probably cause chemical burns with tissue destruction; severity would depend on concentration and length of exposure. Most severe effects expected on wet skin, since acetic anhydride reacts with water to form corrosive acetic acid and releasing heat. Sensitization (allergic reaction) can occur. Slightly toxic to animals by absorption.*

In contact with eyes: *Corrosive. Lacrymator. Vapour concentrations above 5 ppm can cause irritation, reddening, tearing. Liquid and high vapour concentrations cause immediate burning*

sensation, severe corneal and conjunctival damage, possible irreversible injury and blindness.

Ingested: *Corrosive. No human information available, but expected to cause severe irritation, burns, ulceration of gastrointestinal tract, with gastric pain, nausea, vomiting, hemorrhaging. May cause circulatory collapse and death. If death does not occur, healing may take weeks to months, and may leave permanent scar tissue.*

Effects of Chronic Exposure to Product:

Prolonged or repeated exposure may cause respiratory irritation, blood changes, corneal lesions (based on animal testing).

Carcinogenicity: *No human or animal information available*

Teratogenicity: *No human or animal information available*

Reproductive Effects: *No human or animal information available*

Mutagenicity: *No human or animal information available. Negative results in bacterial cells.*

Synergistic Products: *None known*

PREVENTIVE MEASURES

Engineering Controls: *Use isolated, corrosion-resistant, non-sparking, grounded ventilation system to control airborne vapour.*

Respiratory Protection: *Up to 125 ppm: NIOSH approved powered air-purifying respirator with organic vapour cartridges or continuous flow supplied-air respirator. Up to 200 ppm: full face-piece continuous-flow supplied-air respirator with organic vapour cartridges, or full face-piece supplied-air respirator or self-contained breathing apparatus. Higher or unknown concentrations, as in fire or spill conditions: positive pressure, full facepiece self-contained breathing apparatus, or positive pressure, full face-piece air-supplied respirator with an auxiliary positive pressure self-contained breathing apparatus.*

Eye Protection: *Chemical goggles and/or face shield. Do not wear contact lenses.*

Skin Protection: *Butyl rubber, Viton™/butyl rubber, Silver Shield/4H(™(polyethylene/ethylene vinyl alcohol), Trellchem™HPS, Tychem™BR/LV, Tychem™SL, Tychem™TK gloves. Other impervious protective clothing, apron, sleeves, coveralls, boots, as required to prevent contact. For some operations, an impervious, full body encapsulating suit may be necessary.*

Other Personal Protective Equipment: *Safety shower and eye bath located close to chemical exposure area.*

Leak and Spill Procedure: *Eliminate all ignition sources. Ventilate area. Evacuate area. Cleanup personnel must be thoroughly trained in the hazards of this chemical and must wear protective equipment and clothing sufficient to prevent inhalation of vapours or mists and contact with skin and eyes. Stop or reduce discharge if safe to do so. Contain spill with inert absorbent (sand, earth). Prevent from entering sewers or waterways. Recover product and collect contaminated soil for disposal. Waste may be treated carefully with lime or sodium bicarbonate to neutralize. Contaminated absorbent may pose the same hazards as the spilled product. Flush area of spill with copious amounts of running water.*

Waste Disposal: *Follow all federal, provincial, and local regulations.*

Handling Procedures and Equipment: *COMBUSTIBLE, CORROSIVE, VERY TOXIC. Personnel working with this chemical must be thoroughly trained in its hazards, and its safe use, must wear appropriate protective equipment and clothing, in an area with proper ventilation and engineering controls. Ground and bond all equipment to prevent static charge accumulation. Use non-sparking tools. Post "No Smoking" signs. Keep away from water. Post "Do not use Water" signs in areas of use. Use smallest amount possible for the purpose, in a designated area with adequate ventilation. Avoid generating vapour or mist. Do not use pressure to transfer liquid. Keep containers closed when not in use. Avoid all contact with eyes, skin or clothing.*

Storage Requirements: *Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight and away from all sources of ignition and incompatible materials. Keep in an area without water service. Keep tightly closed when not in use. Storage facilities should be made of fire and corrosion resistant materials, and have raised sills and a trench which drains to a safe location. Protect from damage. Inspect regularly for signs of leaking, bulging, or damage. Containers may need to be vented after storage; this procedure must be performed by trained personnel using extreme caution. Keep storage area clear of combustible materials. Bond and ground metal containers in storage area.*

FIRST AID MEASURES

Specific Measures:

Eyes: *IMMEDIATELY flush eyes with gently running water for at least thirty (30) minutes, holding eyelids open while flushing. Take care not to rinse contaminated water into unaffected eye. Wear protective gloves and clothing sufficient to prevent contact during first aid measures. GET MEDICAL ATTENTION IMMEDIATELY.*

Skin: *Remove contaminated clothing under running water (including shoes, watches, belts, and rings). Wear protective gloves and clothing sufficient to prevent contact. Immediately flush the exposed area with large amounts of running water for at least twenty (20) minutes, taking particular care to clean folds and creases. GET MEDICAL ATTENTION IMMEDIATELY. Decontaminate clothing before reuse, or discard.*

Inhalation: *IMMEDIATELY remove casualty from contaminated area to fresh air (caution must be used by rescuers to avoid exposure to the contaminating fumes). Give oxygen for breathing difficulty. If breathing has STOPPED give artificial respiration; use mouth guard to avoid contact. If breathing and pulse are ABSENT, give CPR. IMMEDIATELY CONTACT A PHYSICIAN. Stay with casualty until medical help arrives. Symptoms of pulmonary edema may be delayed for up to 48 hours; continue monitoring of victim during that period.*

Ingestion: *DO NOT INDUCE VOMITING. If casualty is alert and NOT convulsing, rinse mouth with water and give 1 to 2 cups of water or milk to dilute material. If spontaneous vomiting occurs; have casualty lean forward with head down to avoid breathing in of vomitus. Rinse mouth and administer more water or milk. IMMEDIATELY GET MEDICAL ATTENTION. 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: *March 10, 1989*

Revision: *March 2011*

MSDS *1100-1*

Proposed WHMIS Designation: *B3; D1A; D2B; E*

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