

ETHANOL

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: Ethanol, denatured, DA 2A; Ethyl alcohol

Chemical Family: Alcohols

Chemical Formula: C₂H₅OH with CH₃OH

Product Use: Laboratory reagent

Manufacturer's Name and Address:

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
Ethanol	85-90	1000 ppm	64-17-5
Methanol	10-15 (skin)	200 ppm	67-56-1
Ethyl acetate	<1	(TWA) 400 ppm	141-78-6

PHYSICAL DATA

Physical State: Liquid

Odour and Appearance: Clear, colourless volatile liquid, sweet alcohol odour.

Odour Threshold (ppm): 100-180 ppm (recognition), reports vary widely. Good warning properties, detection well below TLV.

Vapour Pressure (mm Hg): 44.3 mm @ 20°C

Vapour Density (Air = 1): 1.5

Evaporation Rate: 2.4 (butyl acetate=1)

Boiling Point (degrees C): 78.3°C

Freezing Point (degrees C): -114°C

pH: Not available

Specific Gravity: 0.789 @ 20°C

Coefficient of Water/Oil distribution: log P(oct) = -0.32

SHIPPING DESCRIPTION

UN: 1986

T.D.G. Class: 3 (6.1)

Pkg. Group: II

REACTIVITY DATA

Chemical Stability: Stable, hygroscopic.

Incompatibility with other substances: May react violently or explosively, with oxidizing agents, acids, acid chlorides, acid anhydrides, alkali metals, acetyl chloride, bromides, fluorides. May form shock-sensitive compounds with perchloric acid or metal perchlorates, nitric acid, some nitrates, aqueous ammonia, silver and silver oxide. Mixtures with concentrated hydrogen peroxide can be detonated by shock or heat. Ignites with potassium tert-butoxide. Not corrosive to most metals; may react with hot aluminum.

Reactivity: Avoid heat, sparks, open flame, all ignition sources, and all incompatible materials. Avoid generation of mist.

Hazardous Decomposition Products: CO_x

FIRE AND EXPLOSION DATA

Flammability: Flammable liquid and vapour. Releases

vapours that form explosive mixtures with air at or above 13°C. Vapours may travel considerable distance to source of ignition and flash back. Can accumulate in confined spaces, causing toxicity and flammability hazard. Closed containers may explode in heat of fire.

Extinguishing Media: CO, dry chemical, alcohol or polymer foam. Water may be ineffective for extinguishing, but as spray or fog may be used to cool containers, disperse vapours, dilute chemical to non-flammable mixture. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment (NIOSH/OSHA approved self-contained breathing apparatus) and clothing (Bunker Gear) sufficient to prevent inhalation of mists or vapours, and contact with skin and eyes. Closed containers may rupture violently during fire; withdraw immediately in case of rising sound from vent or discoloration of tank.

Flash Point (Method Used): 13°C (CC)

Autoignition Temperature: 363°C

Upper Explosion Limit (% by volume): 19.0%

Lower Explosion Limit (% by volume): 3.3%

Hazardous Combustion Products: CO_x

Sensitivity to Impact: None identified

Sensitivity to Static discharge: Liquid will not accumulate static charge. Vapour in the flammable range can be ignited by a electrostatic discharge of sufficient energy.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

TOXICOLOGICAL DATA:

LD₅₀: Ethanol: 7,060 mg/kg (oral, rat); Methanol: (oral, rat) 5,600 mg/kg; (dermal, monkey) 1.6 g/kg (low toxicity to animals both orally and by skin contact); Ethyl acetate: (oral, rat) 5,600 mg/kg; (dermal, rabbit) >20 mL/kg

LC₅₀: Ethanol (mouse) 21,000 ppm/4-h; Methanol: (rat) 64,000 ppm/4 h (practically non-toxic to rats); Ethyl acetate (rat) 16,000 ppm/6h; (mouse) 44,000 mg/m³/3h

EFFECTS OF ACUTE EXPOSURE TO PRODUCT:

Inhaled: Irritating. 1,800 to 2,000 ppm(aerosol) for 30 min caused coughing, dry throat, temporary bronchial constriction. Brief exposure to 5,000 to 10,000 ppm also caused temporary irritation, coughing, 16,000 ppm caused continuous irritation, 21,300 ppm was considered intolerable, even for a very short period. Can be narcotic in high concentrations, causing headache and dizziness, nausea and vomiting, eventual unconsciousness, but these effects are not likely to occur from inhalation unless the chemical is heated or misted.

In contact with skin: Direct contact with vapour, mist or liquid may cause mild irritation. Prolonged or repeated exposure may cause dermatitis. Ethanol is not readily absorbed through the skin, but methanol may be absorbed, with systemic effects such as CNS depression and blindness.

In contact with eyes: Liquid is moderate to severe irritant, causing conjunctivitis, redness and tearing. Vapour concentrations of 7,000 to 10,000 ppm also cause temporary moderate irritation. No irritation was noted at 2,500 ppm.

Ingested: Ethanol has low oral toxicity. Ingestion of large amounts causes lack of co-ordination, slurred speech, impaired judgement, nausea, vomiting, eventual unconsciousness and death from respiratory failure. Lethal dose for humans, approximately 1 L of 40-55% ethanol. Methanol is very toxic and

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may cause CNS depression and blindness. Severe overexposure may cause metabolic acidosis, unconsciousness and death. Onset of symptoms may be delayed 18 to 24 hours after exposure. Ingestion damages the kidneys, liver, heart and other organs. 60 to 200 mL is considered fatal for humans; as little as 10 mL has caused blindness. Aspiration into the lungs, which can occur during ingestion or vomiting, can cause severe lung damage, chemical pneumonitis, and even death.

EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:

Prolonged or repeated exposure may cause liver, cardiovascular, respiratory and nervous system damage, but these effects are from chronic ingestion of alcoholic beverages rather than occupational exposure. May adversely affect persons with chronic disease of the central nervous system, skin, gastrointestinal tract, and/or eyes.

Carcinogenicity: Not classifiable as human carcinogen.

Teratogenicity: May cause teratogenic effects, fetal alcohol syndrome (RTECS No. KQ6300000), but these are usually associated with chronic alcoholism rather than occupational exposure.

Reproductive Effects: May cause reproductive effects, but none shown after occupational exposures.

Mutagenicity: Causes mutagenic effects in germ cells and somatic cells of live animals, and in alcoholics, but none shown after occupational exposures.

Synergistic Products: Alcohol increases the toxicity of many other chemicals, including other alcohols, ketones, halogenated hydrocarbons, aromatic amines, nitrosamines, certain metals (Co, Mn, Hg) and their compounds.

PREVENTIVE MEASURES

Engineering Controls: Non-sparking, grounded exhaust ventilation, separate from other ventilation systems.

Respiratory Protection: Up to 3300 ppm, NIOSH/OSHA approved supplied-air respirator or full facepiece self-contained breathing apparatus. Higher or unknown concentrations, or for fire or spill conditions, positive pressure, full facepiece self-contained breathing apparatus, or full facepiece supplied-air respirator with auxiliary positive pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles and/or face shield.

Skin Protection: Butyl rubber, Viton™, Viton™/Butyl rubber, Barrier (PE/PA/PE), Silver Shield/4H™ (polyethylene /ethylene vinyl alcohol) gloves. Other impermeable clothing, apron, sleeves, coveralls, or boots as required to prevent contact.

Other Personal Protective Equipment: An eyewash and safety shower should be nearby and ready for use.

Leak and Spill Procedure: Eliminate all sources of ignition. 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. Contaminated absorbent may pose the same hazards as the spilled product. Flush area of spill with running water.

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

Handling Procedures and Equipment: FLAMMABLE, TOXIC, TERATOGEN, MUTAGEN. Workers must be thoroughly trained in the handling of hazardous materials and in the

hazards of this material and its safe use, and must wear appropriate protective equipment and clothing. Eliminate all ignition sources. Post "No Smoking" signs. Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid "splash filling" of containers. Keep storage and work areas free of combustible or incompatible materials. Avoid generating mists or vapours. Avoid all contact and inhalation. Use the smallest amount possible for the purpose, in a designated area with adequate ventilation. Empty containers may contain hazardous residues; treat with caution.

Storage Requirements: Store in suitable, labelled containers, a cool, dry, well-ventilated area, out of direct sunlight, and away from heat, sparks and flame, or any combustible or incompatible materials (e.g. oxidizing agents). Protect from damage and inspect frequently for signs of damage and/or leaking. Keep tightly closed. Storage area should have raised sills to contain leaks and trenches to conduct them to a safe area.

FIRST AID MEASURES

SPECIFIC MEASURES:

Eyes: IMMEDIATELY flush eyes with warm running water, holding eyelids open during flushing, for at least twenty (20) minutes, or until no trace of chemical remains. Take care not to flush contaminated water into unaffected eye. Obtain medical advice immediately.

Skin: Remove contaminated clothing including rings, watches, belts and shoes. Flush exposed area with large amounts of warm running water for five to ten (5 to 10) minutes, or until no trace of chemical remains. If irritation persists, get medical attention.

Inhalation: Remove to fresh air. Eliminate ignition sources. Give oxygen and get medical attention for breathing difficulty.

Ingestion: DO NOT INDUCE VOMITING. Danger of aspiration with emesis. If casualty is alert and NOT convulsing, rinse mouth with water and give 1 to 2 cups of water to drink to dilute material. Immediately get medical attention. If spontaneous vomiting occurs, have casualty lean forward with head down to avoid breathing in of vomitus. Rinse mouth and give more water to drink.

REFERENCES USED

CCINFO disc: Cheminfo
Budavari: The Merck Index, 12th ed., 1997
Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 1, 1992
Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979
Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: July 15, 1991

Revision: Jan 2012

MSDS: 1500-1

Proposed WHMIS Designation: B2; D2A; D2B

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