



Material Safety Data Sheet

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Phone Calls: 301-816-8129
8 a.m. to 5 p.m. EST Mon. - Fri.

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RESIDUAL SOLVENT CLASS 2 - ACETONITRILE

Catalog Number: 1601340

Revision Date:

April 14, 2008

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Common Name: Acetonitrile

Manufacturer: U. S. Pharmacopeia

Responsible Party: Reference Standards Technical Services

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Product Use: USP Reference Standards and Authentic Substances are used for chemical tests and assays in analytical, clinical, pharmaceutical, and research laboratories.

SECTION 2 - HAZARD INFORMATION

This reference standard contains acetonitrile in dimethyl sulfoxide (DMSO). The mixture has not been tested to determine specific physical hazards, but it is considered potentially combustible.

Dimethyl sulfoxide is a skin and eye irritant. Dimethyl sulfoxide is rapidly absorbed through skin and mucous membranes and may enhance skin absorption of other chemicals.

Acetonitrile is toxic and an irritant.

Adverse Effects: Adverse effects of DMSO may include redness, itching, or rash on skin; garlic-like taste or odor on breath and skin; swelling of face; troubled breathing; shortness of breath; nasal congestion, gastrointestinal disturbances, drowsiness, and headache. Possible allergic reaction to material if inhaled, ingested or in contact with skin.

Overdose Effects: Signs of acetonitrile toxicity are typically delayed 2 to 13 hours as it is converted to cyanide in the body. Nausea and vomiting are common initial signs, followed by vomiting of blood; deep, rapid, or labored breathing; headache; dizziness; agitation; confusion; weakness; seizures; fast, slow, or irregular heart rate; low blood pressure; cardiac arrest; coma; and death.

Acute: Eye, skin, gastrointestinal and/or respiratory tract irritation and cyanide poisoning.

Chronic: Possible hypersensitization.

Medical Conditions Aggravated by Exposure: Hypersensitivity to material; anemia; and diseases of the central nervous system, heart, thyroid, and lungs.

Cross Sensitivity: n/f

Target Organs: Respiratory, cardiovascular, and central nervous systems; liver; kidneys

For additional information on toxicity, see Section 11.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS**Common Name:** Acetonitrile**Formula:** See Composition**Synonym:** Methyl cyanide; cyanomethane; ethanenitrile**Chemical Name:** Acetonitrile in dimethyl sulfoxide**CAS:** See Composition**RTECS Number:** See Composition**Chemical Family:** Aliphatic nitrile (acetonitrile)**Therapeutic Category:** Residual solvent**Composition:** Acetonitrile (C₂H₃N; CAS# 75-05-8; RTECS # AL7700000): 0.2050%
Dimethyl Sulfoxide (C₂H₆O₅; CAS # 67-68-5; RTECS # PV6210000): 99.795%**SECTION 4 - FIRST AID MEASURES****Inhalation:** Causes irritation. Avoid inhalation. Remove to fresh air.**Eye:** Causes irritation. Avoid contact. Flush with copious quantities of water for at least 15 minutes.**Skin:** Causes irritation and toxicity. Avoid contact. Acetonitrile is absorbed through the skin and metabolized to cyanide in the body. DMSO readily penetrates skin and may enhance skin absorption of other chemicals. Flush with copious quantities of soap and water.**Ingestion:** Causes irritation and toxicity. Avoid ingestion. Acetonitrile is absorbed from the gastrointestinal tract and metabolized to cyanide in the body. Flush out mouth with water and seek medical attention.**General First Aid Procedures:** Remove from exposure. Remove contaminated clothing. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention. If person is not breathing give artificial respiration. If breathing is difficult give oxygen. Obtain medical attention.**Note to Physicians****Overdose Treatment:** Patients with significant exposure to acetonitrile should be treated as for cyanide poisoning. Treatment should be symptomatic and supportive and may include the following:

1. Vomiting usually occurs spontaneously. Do not induce vomiting. Perform gastric lavage to decontaminate or administer activated charcoal.
2. Assist ventilation and administer 100% oxygen.
3. Admit patients with potential ingestion or inhalation exposure to a hospital for at least 24 to 48 hours of observation for the development of cyanide poisoning. Toxicity may be prolonged, with clinical deterioration following initial response to antidote treatment reported for as long as 3 days following ingestion.
4. Monitor arterial blood gasses, pulse oximetry, cardiac function, liver and kidney function, hemoglobin and platelet count, and plasma lactate levels.
5. Correct severe metabolic acidosis with sodium bicarbonate. Correct fluid and electrolyte disturbances.
6. Administer a cyanide antidote kit containing hydroxocobalamin or amyl nitrate, sodium nitrite, and sodium thiosulfate to patients who are significantly symptomatic with unstable vital signs, metabolic acidosis, impaired consciousness, seizures, coma, or cardiorespiratory compromise.
7. For seizures, administer intravenous diazepam or lorazepam. If seizures recur, consider phenobarbital. Monitor for hypotension, dysrhythmias, respiratory depression, and need for endotracheal intubation. Evaluate for hypoglycemia, electrolyte imbalances, and hypoxia.
8. For hypotension, infuse isotonic fluid. If hypotension persists, administer dopamine or norepinephrine. [HSDB 2008; Hazardtext 2008]

SECTION 5 - FIREFIGHTING MEASURES**Extinguisher Media:** Alcohol foam or other appropriate media.**Fire and Explosion Hazards:** DMSO is combustible and reacts violently with many acyl, aryl and non-metal halides, boron compounds and metal salts of oxoacids. The mixture has not been tested.

Firefighting Procedures: As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.

SECTION 6 - ACCIDENTAL RELEASE MEASURES
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Spill Response: Wear approved respiratory protection, chemically compatible gloves and protective clothing. Remove all ignition sources. Ventilate enclosed spaces. Wipe up spillage. Avoid breathing vapors. Place spillage in appropriately-labelled container for disposal. Wash spill site.

SECTION 7 - HANDLING AND STORAGE

Handling: As a general rule, when handling USP Reference Standards avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Wash thoroughly after handling.

Storage: Store in tight, light-resistant container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

SECTION 8 - EXPOSURE CONTROL / PERSONAL PROTECTION

Engineering Controls: Engineering controls such as exhaust ventilation are recommended.

Respiratory Protection: Use a NIOSH approved respirator, if it is determined to be necessary by an industrial hygiene survey involving air monitoring.

Gloves: Chemically compatible

Eye Protection: Safety glasses or goggles

Protective Clothing: Protect exposed skin.

Exposure Limits: For acetonitrile:
OSHA: TWA 40 ppm; STEL 60 ppm
NIOSH: TWA 20 ppm; IDLH 500 ppm
ACGIH: TWA 20 ppm (skin)
For DMSO:
AIHA: 250 ppm

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Properties as indicated on the MSDS are general and not necessarily specific to the USP Reference Standard Lot provided.

Appearance and Odor: Colorless liquid.

Odor Threshold: n/f

pH: n/f

Melting Range: n/f

Boiling Point: n/f

Flash Point: n/f

Autoignition Temperature: n/f

Evaporation Rate: n/f

Upper Flammability Limit: n/f

Lower Flammability Limit: n/f

Vapor Pressure: n/f

Vapor Density: n/f

Specific Gravity: n/f

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Solubility in Water: n/f**Fat Solubility:** n/f**Other Solubility:** n/f**Partition Coefficient: n-octanol/water:** n/f**Percent Volatile:** n/f**Reactivity in Water:** n/f**Explosive Properties:** n/f**Oxidizing Properties:** n/f**Formula:** See Composition**Molecular Weight:** n/f

SECTION 10 - STABILITY AND REACTIVITY
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Conditions to Avoid: Avoid exposure to light and moisture.

Incompatibilities: Oxidizing agents, reducing agents, acids, bases, acid chlorides, carboxylic acid anhydrides, alkali hydrides, and methyl bromide

Decomposition Products: When heated to decomposition material emits toxic fumes of HCN, NO_x, and SO_x. Emits toxic fumes under fire conditions.

Stable? Yes **Hazardous Polymerization?** No

SECTION 11 - TOXICOLOGICAL PROPERTIES
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Oral Rat: For acetonitrile:
LD50: 2730 mg/kg; 2460 mg/kg; 175 mg/kg
For DMSO:
LD50: 14500 mg/kg

Oral Mouse: For acetonitrile:
LD50: 269 mg/kg
For DMSO:
LD50: 7920 mg/kg

Other Toxicity Data: For acetonitrile:
Inhalation Rat LC50: 7551 ppm/8H
Dermal Rabbit LD50: 980 mg/kg
For DMSO:
Inhalation Rat LC50: >25 mg/L/40 hour
Dermal Mouse LD50: 50 grams/kg
Dermal Rat LD50: 40 grams/kg

Irritancy Data: For acetonitrile:
Rabbit/skin (500 mg): mild;
Rabbit/eye (100 microliters/24H): moderate
For DMSO:
Rabbit/skin (Standard Draize, 500 mg/24 hour): mild
Rabbit/skin (Open Draize, 10 mg/24 hour): mild
Rabbit/eye (Standard Draize, 500 mg/24 hour): mild

Corrosivity: n/f

Sensitization Data: For DMSO: Guinea pig Buehler test: not sensitizing

Listed as a Carcinogen by: **NTP:** No **IARC:** No **OSHA:** No

Other Carcinogenicity Data: Acetonitrile is not classifiable as to human carcinogenicity. In two-year inhalation studies in rats exposed to up to 400 ppm there was equivocal evidence of carcinogenic activity in males (increase in hepatocellular adenomas and carcinomas) but not in females, and inhalation studies in mice exposed to up to 200 ppm acetonitrile showed no evidence of carcinogenic activity.

Mutagenicity Data: Acetonitrile caused aneuploidy in yeast but was not mutagenic in the Ames Salmonella microsome assay and did not cause mutations in mouse cells.
Dimethyl sulfoxide did not show a potential to induce gene mutations in bacterial or yeast cells, and was not mutagenic in in vivo studies in Drosophila. Dimethyl sulfoxide did not induce micronuclei or sister-chromatid exchange in mice or chromosomal aberrations or sister chromatid exchange in mammalian cells, but did induce an increase in chromosomal aberrations in rats. [EPA 2007]

Reproductive and Developmental Effects: For acetonitrile: Exposure to acetonitrile by pregnant hamsters, either by inhalation of 5000 or 8000 ppm, or ingestion or injection of 100 to 400 mg/kg resulted in offspring with skeletal malformations. However, a study in rats involving inhalation doses up to 1800 ppm showed maternal toxicity in 40% of the exposed animals but no increase in birth defects in the offspring of the surviving rats; and in another rat study, oral doses of 275

mg/kg/day caused maternal and fetal toxicity but did not increase the incidence of birth defects in the offspring.

For DMSO: Examination of the reproductive system during a 13-week inhalation repeated-dose toxicity study in rats revealed no abnormalities on estrus cycle in females, sperm count, motility or morphology in males, or on the reproductive organs of both sexes. In two oral developmental toxicity studies in rats, maternal effects included decreased food consumption and decreased body weight gain. Developmental effects included decreased fetal weights, higher rates of early resorptions per animal, increased total post-implantation loss, dilated renal pelvis, dilated ureters and reduced or delayed ossification of ribs. All of the fetal effects except dilated renal pelvis occurred at levels that demonstrated maternal toxicity.

LOAEL (maternal toxicity) = 5000 mg/kg/day (based on decreased food consumption and body weight gain)

NOAEL (maternal toxicity) = 1000 mg/kg/day

LOAEL (developmental toxicity) = 200 mg/kg/day (based on dilated renal pelvis at lowest dose tested)

NOAEL (developmental toxicity) < 200 mg/kg/day

[EPA 2007]

SECTION 12 - ECOLOGICAL INFORMATION

Ecological Information: n/f

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Dispose of waste in accordance with all applicable Federal, State and local laws.

SECTION 14 - TRANSPORT INFORMATION

Shipping Name: n/f

Class: n/f

UN Number: n/f

Packing Group: n/f

Additional Transport Information: n/f

SECTION 15 - REGULATORY INFORMATION

U.S. Regulatory Information: For acetonitrile:
CERCLA Reportable Quantity: 5000 pounds (2270 kg)

International Regulatory Information: For acetonitrile:
Hazard code: Xn, Xi
Risk phrases: R20/21/22, R36
Safety phrases: S36/37

SECTION 16 - OTHER INFORMATION

Revision: 14-Apr-08

Previous Revision Date: 29-Sep-03