Material Safety Data Sheet

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8 a.m. to 5 p.m. EST Mon. - Fri.

RESIDUAL SOLVENT CLASS 2 - TRICHLOROETHYLENE

Catalog Number: 1601827 **Revision Date:** May 28, 2009

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Common Name: Trichloroethylene

Manufacturer: U. S. Pharmacopeia

Responsible Party: Reference Standards Technical Services

Mailing Address: 12601 Twinbrook Parkway, Rockville, MD 20852 USA

Phone: 301-816-8129

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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 trichloroethylene in dimethyl sulfoxide (DMSO). The mixture has not been tested to determine specific physical hazards, but it is considered potentially combustible.
DMSO is an irritant and is rapidly absorbed through the skin. It may carry dissolved chemicals into the body through this route.
Trichloroethylene is a possible human carcinogen 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. Adverse effects of trichloroethylene exposure may include inebriation, headache, fatigue, excitement, nausea, vomiting, diarrhea, abdominal pain, dizziness, sleepiness, memory deficits, inability to concentrate, tingling, muscle discomfort, chest pain, visual disturbances, difficulty breathing, confusion, and loss of coordination. Possible allergic reaction to material if inhaled, ingested, or in contact with skin.

Overdose Effects: Prolonged or high exposures to trichloroethylene may cause liver or kidney damage, cardiac dysrhythmias, unconsciousness, convulsions, coma, and death from respiratory or cardiac failure.

Acute: Eye, skin, gastrointestinal, and/or respiratory tract irritation and central nervous system excitation followed by depression.

Chronic: Possible hypersensitization, nerve damage, ECG changes, and cancer.

Medical Conditions Aggravated by Exposure: Hypersensitivity to material; use of alcohol or treatment with disulfiram; convulsive disorders; and disease of the central nervous system, liver, or kidneys.

Cross Sensitivity: n/f

Target Organs: Central nervous system, respiratory system, heart, liver, kidneys (Trichloroethylene)

For additional information on toxicity, see Section 11.

n/f = not found

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Common Name: Trichloroethylene

Formula: See Composition

Synonym: Trichloroethene, TCE

Chemical Name: 1,1,2-Trichloroethylene in dimethyl sulfoxide

CAS: See Composition

RTECS Number: See Composition

Chemical Family: Chlorinated hydrocarbon (Trichloroethylene)

Therapeutic Category: Residual solvent

Composition: Trichloroethylene: (C_2HCl_3; CAS # 79-01-6; RTECS # KX4550000): 0.04%
Dimethyl sulfoxide: (C_2H_6OS; CAS # 67-68-5; RTECS # PV6210000): 99.96%

SECTION 4 - FIRST AID MEASURES

Inhalation: Causes irritation and toxicity. Remove to fresh air. This material is absorbed through the lungs.

Eye: Causes irritation and toxicity. Flush with copious quantities of water for at least 15 minutes.

Skin: Causes irritation. Flush with copious quantities of soap and water. DMSO readily penetrates the skin and can enhance absorption of other chemicals.

Ingestion: Causes irritation and toxicity. Flush out mouth with water. This material is absorbed from the gastrointestinal tract.

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: Treatment of trichloroethylene overdose should be symptomatic and supportive and may include the following:
1. Do not induce vomiting because of the potential for cardiovascular instability and CNS depression.
2. Consider gastric lavage and activated charcoal after ingestion.
3. Following inhalation, evaluate for respiratory tract irritation, bronchitis, or pneumonitis if cough or difficulty breathing develops. Administer oxygen and assist ventilation as required. Treat bronchospasm with beta-2 agonist and corticosteroid aerosols.
4. For acute lung injury: Maintain ventilation and oxygenation and evaluate with frequent arterial blood gas or pulse oximetry monitoring. Early use of PEEP and mechanical ventilation may be needed.
5. Monitor ECG and vital signs frequently in symptomatic patients.
6. Avoid epinephrine and other catecholamines (especially beta agonists), which may increase the risk of dysrhythmias.
7. Pulmonary edema, renal failure, and liver injury should be managed symptomatically.
8. For ventricular dysrhythmias: Institute continuous cardiac monitoring, obtain an ECG, and administer oxygen. Evaluate for hypoxia, acidosis, and electrolyte disorders. Lidocaine and amiodarone are generally first-line agents for stable monomorphic ventricular tachycardia, particularly in patients with underlying impaired cardiac function. Unstable rhythms require cardioversion. Ventricular dysrhythmias may also respond to beta blockers. A short-acting titratable agent such as esmolol is preferred.
9. For hypotension: Infuse patient with isotonic fluid and place in Trendelenburg position. If hypotension persists, administer dopamine or norepinephrine titrate to desired response. [Poisindex 2009]

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. Vapors may form explosive mixtures with air. Vapors may travel to sources of ignition and flash back. This mixture has not been tested.

n/f = not found

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

Spill Response: Wear approved respiratory protection, chemically compatible gloves, and protective clothing. Remove ignition sources. Ventilate enclosed spaces. Absorb with suitable material. Do not flush into a confined space such as a sewer. Avoid breathing vapors. Place spillage and all contaminated cleanup materials in an appropriately labeled 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 goggles or glasses

Protective Clothing: Protect exposed skin.

Exposure Limits: Trichloroethylene:
OSHA: TWA 100 ppm; CL 200 ppm; peak 300 ppm (5 min. every 2 hr.)
NIOSH: TWA 25 ppm; IDLH 1000 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

Solubility in Water: n/f

Fat Solubility: n/f

n/f = not found

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

n/f = not found

SECTION 10 - STABILITY AND REACTIVITY

Conditions to Avoid: Avoid exposure to light.

Incompatibilities: n/f

Decomposition Products: When heated to decomposition, material emits toxic fumes. Emits toxic fumes under fire conditions.

Stable? Yes **Hazardous Polymerization?** No

SECTION 11 - TOXICOLOGICAL PROPERTIES

Oral Rat: LD50: 4920 mg/kg (Trichloroethylene); 14500 mg/kg (DMSO)

Oral Mouse: LD50: 2402 mg/kg (Trichloroethylene); 7920 mg/kg (DMSO)

Other Toxicity Data: DMSO:
Inhalation Rat LC50: > 25 mg/L/40 hour
Skin Mouse LD50: 50 grams/kg
Skin Rat LD50: 40 grams/kg

Irritancy Data: Trichloroethylene:
Skin/rabbit: severe
Eye/rabbit: moderate

DMSO:
Skin/rabbit (Standard Draize, 500 mg/24 hour): mild
Skin/rabbit (Open Draize, 10 mg/24 hour): mild
Eye/rabbit (Standard Draize, 500 mg/24 hour): mild

Corrosivity: n/f

Sensitization Data: Guinea Pig Buehler Test: not sensitizing (DMSO)

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

Other Carcinogenicity Data: Trichloroethylene:
Trichloroethylene is listed as a carcinogen by NTP and IARC. A two-fold risk for cervical cancer was observed in two cohort studies in women. There is evidence that it causes liver, kidney, and lung cancer in animals.

Mutagenicity Data: Trichloroethylene:
Trichloroethylene has produced mixed genotoxic results in humans, in laboratory animals, and in cultured cells.

DMSO:
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.

Reproductive and Developmental Effects: Trichloroethylene:
Results of animal studies using trichloroethylene have been mixed. Some studies have shown no evidence of toxicity or birth defects; others have shown adverse effects. There have been reports associating trichloroethylene in drinking water with low birth weights and heart disease in humans, but studies were not conclusive.

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.

SECTION 12 - ECOLOGICAL INFORMATION

Ecological Information: n/f

SECTION 13 - DISPOSAL CONSIDERATIONS

Disposal: Place material in a thick plastic hazardous waste disposal bag or leakproof container and label it CAUTION: HAZARDOUS CHEMICAL WASTE. Dispose of waste in accordance with all applicable Federal, State, and local laws.

SECTION 14 -TRANSPORT INFORMATION

Shipping Name: Trichloroethylene 0.04% Solution

Class: 6.1

UN Number: UN1710

Packing Group: III

Additional Transport Information: n/f

SECTION 15 - REGULATORY INFORMATION

U.S. Regulatory Information: California Proposition 65: Carcinogen (Trichloroethylene)

International Regulatory Information: EINECS # 201-167-4 (Trichloroethylene)

EINECS # 200-664-3 (DMSO)

SECTION 16 - OTHER INFORMATION

Revision: 28-May-09

Previous Revision Date: 28-Oct-03

n/f = not found