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MATERIAL SAFETY DATA SHEET

SULFURIC ACID

Emergency Contact: William W. Gorman, Jr. Date: 09/15/88

The information below is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

Substance Identification

CAS-Number 7664-93-9

Trade Names/Synonyms: Oil of Vitriol; BOV; Dipping Acid; Vitriol Brown Oil; Hydrogen Sulfate; Nordhausen Acid; A-300; A-300C; A-300-SI; A-300S; A-298; SO-A-172; SO-A-174

Chemical Family: Inorganic Acid

Molecular Formula: H_2SO_4
Molecular Weight: 98.07

Cercla Ratings (Scale 0-3): Health=3; Fire=0; Reactivity=2; Persistence=0

Components and Contaminants

Percent: 98
Component: Sulfuric Acid
Percent: 2
Component: Water
Other Contaminants: None
Exposure Limits: 1 Mg/M3 OSHA TWA; 1 Mg/M3 ACGIH TWA; 1 Mg/M3 NIOSH Recommended TWA

Physical Data

Description: Colorless to dark brown, oily liquid
Boiling Point: 536°F (280°C)
Melting Point: 37°F (3°C)
Specific Gravity: 1.8
Vapor Pressure: 0.001 @ 20°C
Solubility in Water: Soluble
Solvent Solubility: Decomposes in alcohol
Odor Threshold: 1 Mg/M3
Vapor Density: 3.4

Fire and Explosion Data

Fire and Explosion Hazard: Negligible fire and explosion hazard when exposed to heat or flame.

Flash Point: Non-Flammable

Firefighting Media: Dry chemical or carbon dioxide (1984 Emergency Response Guidebook, DOT P 5800.3).

For larger fires, flood area with water from a distance (1984 Emergency Response Guidebook, DOT P 5800.3).

Firefighting: Move containers from fire area if possible. Cool containers exposed to flames with water from side until well after fire is out (1984 Emergency Response Guidebook, DOT P 5800.3).

Extinguish using agents indicated; do not use water directly on material. If large amounts of combustible materials are involved, use water spray or fog in flooding amounts. Use water spray to absorb corrosive vapors. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing corrosive vapors; keep upwind (Bureau of Explosives, Emergency Handling of Hazardous Materials in Surface Transportation, 1981).

Toxicity

135 Mg/Kg Unknown-Man LDLO; 2140 Mg/Kg Oral-Rat LD50; 18 Mg/M3/8 Hours. Inhalation-Guinea Pig LC50

Carcinogen Status: None

Sulfuric Acid is a severe eye, pulmonary and skin irritant.

Health Effects and First Aid

Inhalation: Corrosive/Toxic

80 Mg/M3 is immediately dangerous to life and health.

Acute Exposure-Exposure to concentrations containing 5 Mg/M3 may cause nose and throat irritation, headache, cough, an increase in respiratory rate or impairment of ventilatory capacity. Delayed symptoms may include pulmonary edema, tightness in the chest, cyanosis, hypotension, bronchitis or emphysema.

Chronic Exposure-Repeated exposure to the mist causes chronic tracheo-bronchitis, erosion and discoloration of the teeth, bronchial pneumonia or gastrointestinal disturbances.

Skin Contact: Corrosive

Acute Exposure-Contact may cause severe irritation and pain, burns and vesiculation.

Chronic Exposure-Repeated or prolonged exposure to the liquid or mist may cause irritation and dermatitis.

First Aid-Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). In case of chemical burns, cover the areas with sterile, dry dressing. Bandage securely, but not too tightly. Get medical attention.

Eye Contact: Corrosive

Acute Exposure-Direct contact with the concentrated acid solution may cause severe damage, often leading to blindness. Dilute solutions produce more transient effects from which recovery may be complete. Exposure to the mist causes eye irritation and lacrimation.

Chronic Exposure-Repeated or prolonged exposure may cause conjunctivitis and lacrimation.

First Aid-Wash eyes immediately with large amounts of water, occasionally lifting the upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). In case of burns, apply sterile bandages loosely without medication. Get medical attention.

Ingestion: Corrosive

Acute Exposure-Severe burning pain in the mouth, throat and abdomen followed by vomiting and diarrhea of dark, precipitated blood. Asphyxia may occur from swelling of the throat. Perforation of the esophagus and stomach may occur.

First Aid-If victim is conscious, give large quantities of water immediately to dilute the acid. Do not induce vomiting. Get medical attention immediately.

Reactivity

Violent exothermic reaction with water and organic materials. May ignite finely divided combustible materials on contact.

Incompatibilities:

Acetic Anhydride: Mixing in closed container caused temperature & pressure increase.
Acetone Cyanhydrin: Possible explosion.
Acetone and Nitric Acid: Acetone will decompose violently when brought in contact with mixed sulfuric-nitric acids.
Acetone and Potassium Dichromate: Ignition.
Acetonitrile: Mixing in closed container caused temperature & pressure increase.
Acrolein: Mixing in closed container caused temperature & pressure increase.
Acrylonitrile: Vigorous exothermic reaction.
Alcohols and Hydrogen Peroxide: Possible explosion.
Allyl Alcohol: Mixing in closed container caused temperature & pressure increase.
Allyl Chloride: Allyl chloride may violently polymerize.
2-Aminoethanol: Mixing in closed container caused temperature & pressure increase.
Ammonium Hydroxide: Mixing in closed container caused temperature & pressure increase.
Ammonium Triperchromate: Mixing in closed container caused temperature & pressure increase.
Aniline: Mixing in closed container caused temperature & pressure increase.
Bromates and Metals: Possible ignition and fire.
Bromine Pentafluoride: Violent reaction.
N-Butyraldehyde: Mixing in closed container caused temperature & pressure increase.
Carbides: Concentrated sulfuric acid is extremely hazardous in contact with carbides.
Cesium Acetylene Carbide: Ignition
Chlorates: All chlorates, when brought in contact with sulfuric acid may give off explosive chlorine dioxide gas. A violent explosion is usual.
Chlorates and Metals: Ignition likely.
Chlorine Trifluoride: Violent explosion.
Chlorosulfonic Acid: Mixing in closed container caused temperature & pressure increase.
Cuprous Nitride: Violent reaction.
Diisobutylene: Mixing in closed container caused temperature & pressure increase.
Dimethylbenzylcarbinol and Hydrogen Peroxide: Explosion.
Epichlorohydrin: Mixing in closed container caused temperature & pressure increase.
Ethanol and Hydrogen Peroxide: Possible explosion.
Ethylene Cyanohydrin: Violent reaction.
Ethylene Diamine: Mixing in closed container caused temperature & pressure increase.
Ethylene Glycol: Mixing in closed container caused temperature & pressure increase.
Ethylenimine: Mixing in closed container caused temperature & pressure increase.
Fulminates: Sulfuric acid is extremely hazardous in contact with fulminates.
Hydrochloric Acid: Mixing in closed container caused temperature & pressure increase.
Hydrofluoric Acid: Mixing in closed container caused temperature & pressure increase.
Iodine Heptafluoride: The acid becomes effervescent.
Indane and Nitric Acid: Possible explosion.
Iron: Possible explosion due to hydrogen gas from the acid-metal reaction.
Isoprene: Mixing in closed container caused temperature & pressure increase.
Lithium Silicide: Incandescent reaction.
Mercuric Nitride: Explosion.
Mesityl Oxide: Mixing in closed container caused temperature & pressure increase.
Metals (Powdered): Contact with sulfuric acid is extremely hazardous.
Nitric Acid and Glycerides: Explosion.
P-Nitrotoluene: Explosion.
Pentasilver Trihydroxydiaminophosphate: Explosion
Perchlorates: Possible explosion.
Perchloric Acid: Formation of dangerous anhydrous perchloric acid.
Permanganates and Benzene: Possible explosion.
1-Phenyl-2-Methyl-Propyl Alcohol and Hydrogen Peroxide: Possible explosion.
Phosphorus: Yellow phosphorus ignites when placed in boiling concentrated sulfuric acid.
Phosphorus Isocyanate: Violent reaction.
Picrates: Contact with concentrated sulfuric acid is extremely hazardous.
Potassium Tert-Butoxide: Ignition.
Potassium Chlorate: Possible fire and explosion.
Potassium Permanganate: Possible explosion in the presence of moisture.
Potassium Permanganate and Potassium Chloride: Violent explosion.
Beta-Propiolactone: Mixing in closed container caused temperature & pressure increase.
Propylene Oxide: Mixing in closed container caused temperature & pressure increase.

Pyridine: Mixing in closed container caused temperature & pressure increase.
Rubidium Acetylene Carbide: Burns with sulfuric acid.
Silver Permanganate: Explosion
Sodium: Reacts with explosive violence.
Sodium Carbonate: Violent reaction
Sodium Chlorate: Possible fire or explosion.
Sodium Hydroxide: Mixing in closed container caused temperature & pressure increase.
Steel: Possible explosion due to hydrogen gas from the acid-metal reaction.
Styrene Monomer: Mixing in closed container caused temperature & pressure increase.
Toluene and Nitric Acid: Violent reaction.
Vinyl Acetate: Mixing in closed container caused temperature & pressure increase.
Zinc Chlorate: Likely to cause fires and explosions.

Decomposition: Thermal decomposition products include highly toxic fumes of sulfur oxides.
Polymerization: Not known to occur.

Conditions to Avoid

May ignite other combustible materials (wood, paper, oil, etc.). Violent reaction with water. Flammable, poisonous gases may accumulate in confined spaces. Runoff to sewer may create fire or explosion hazard.

Spill and Leak Procedures

Soil Spill: Dig holding area such as lagoon, pond or pit for containment. Dike flow of spilled material using soil or sandbags or foamed barriers such as polyurethane or concrete. Use cement powder or fly ash to absorb liquid mass. Neutralize spill with slaked lime, sodium bicarbonate or crushed limestone.

Air Spill: Knock down vapors with water spray. Keep upwind.

Water Spill: Neutralize with agricultural lime, slaked lime, crushed limestone or sodium bicarbonate. Add suitable agent to neutralize spilled material to pH-7.

Occupational Spill: Keep combustibles (wood, paper, oil, etc.) away from spilled material. Do not touch spilled material. Do not get water inside container. Stop leak if you can do it without risk. Use water spray to reduce vapors. Do not put water on leak or spill area. Clean up only under the supervision of an expert. Dike spill for later disposal. Do not apply water unless directed to do so. Keep unnecessary people away. Isolate hazard area and deny entry. Ventilate closed spaces before entering.

Protective Equipment

Ventilation: Provide local exhaust ventilation system to meet permissible exposure limits.

Respirator:

50 Mg/M3 - Gas mask with a chin-style, front or back-mounted acid gas canister and a high-efficiency particulate filter. High-efficiency particulate respirator with a full face-piece. Supplied-air respirator with a full face-piece, helmet or hood. Self-contained breathing apparatus with full face-piece.

100 Mg/M3 - Type C supplied air respirator with a full face-piece operated in pressure-demand or other positive pressure mode or with a full face-piece, helmet or hood operated in continuous-flow mode.

Escape - Gas mask with a chin-style, front or back-mounted acid gas canister and a high-efficiency particulate filter. Self-contained breathing apparatus.

Firefighting - Self-contained breathing apparatus with a full face-piece operated in pressure-demand or other positive pressure mode.

Clothing: Wear appropriate protective clothing to avoid any possibility of skin contact with liquids containing more than 1% sulfuric acid. Avoid repeated or prolonged skin contact with liquids containing 1% or less sulfuric acid.

Gloves: Employee must wear appropriate protective gloves to prevent contact with this substance.

Eye Protection: Employee must wear splash-proof or dust-resistant safety goggles and a face-shield to prevent contact with this substance.

Where there is any possibility that an employee's eyes may be exposed to this substance, the employer shall provide an eye-wash fountain within the immediate work area for emergency use.