School Material Safety Data Sheet

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ACETIC ANHYDRIDE

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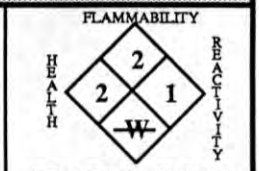
SECTION 1. INTRODUCTORY INFORMATION

MATERIAL NAME AND FORMULA: ACETIC ANHYDRIDE; $C_4H_6O_3$
SYNONYMS: Acetic Oxide; Acetyl Oxide; Ethanoic Anhydride; Acetic Acid, Anhydride; $(CH_3CO)_2O$
CAS NUMBER: 0108-24-7
INGREDIENTS: Acetic Anhydride, >95%
DOT CLASSIFICATION: Corrosive (UN1715)
EPA CLASSIFICATION: Hazardous Substance
MANUFACTURERS: Always request Material Safety Data Sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The Manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.



NFPA FIRE HAZARD SYMBOL
(See Glossary for details)

DESCRIPTION: This material is a colorless, very mobile liquid with a very pungent, irritating, acetic acidlike odor.

PRELIMINARY INFORMATION: Acetic anhydride is a moderate fire hazard. It is corrosive to living tissue, causing burns or severe irritation on contact with vapors or liquid. Its most common area of use would be in the chemistry lab.

SECTION 2. USE AND STORAGE INFORMATION

-- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- **Always provide for safe disposal of all chemical waste generated in the lab.** Check applicable regulations prior to use.
- Provide adequate ventilation or restrict use to fume hood.
- Eliminate all possible sources of ignition. Nearby electrical service and equipment should be explosion proof (no spark-generation potential).
- Whenever possible, substitute less hazardous materials.
- Review sections 3, 5, and 6 to prepare for possible accidents or emergencies.
- Rubber or neoprene gloves are recommended when working with this material. If splashing is possible, a full face shield may be necessary.

-- USAGE PRECAUTIONS AND PROCEDURES --

- READ THE LABEL and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials.
- **For safety, contact lenses should not be worn in the laboratory; soft lenses may absorb irritants and all lenses may concentrate them.**
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- No smoking in storage or use area.
- Do not breathe vapors -- dispense only in a fume hood. Take care to avoid splashing of liquid.
- Keep away from strong oxidizing agents and sources of heat or ignition.
- Reaction with water produces acetic acid and much heat.
- Do not let this material get on skin, in eyes, or on clothing. Do not taste or swallow this substance.
- "Empty" containers may contact product residues in vapor or liquid form. Follow precautions on label.

-- ADDITIONAL INFORMATION --

- Acetic anhydride does not polymerize. This material is stable at room temperature under normal conditions.
- Incompatible with amines, alkaline materials, and oxidizing agents. Water, alcohols, and glycerine give exothermic reactions that can be especially dangerous when acidic catalysts are present.

-- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Outside or detached storage is preferred. Containers should be tightly closed.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Smoking should not be permitted in areas where chemicals are stored.
- Purchase only amounts equivalent to one year's needs, if at all.
- Should be stored in approved FLAMMABLES cabinet, away from oxidizing agents and sources of heat or ignition.

SECTION 3. SPILLS AND DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:
- Eliminate all possible sources of ignition. Nearby electrical service and equipment should be explosion proof (no spark-generation potential). Provide maximum explosion-proof ventilation.
- Cleanup personnel should have protection against inhalation of vapors or mists or contact with liquid.
- Cover material with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into an appropriate container (with secure lid) for disposal in accordance with existing regulations. Dike with inert absorbent material, as needed, to contain and limit spill area.
- Cover contaminated surfaces with soda ash or sodium bicarbonate and spray on a little water to neutralize. Wash residues with soda ash solution. Prevent runoff to sewers or waterways. Acetic anhydride can negatively affect aquatic life.

DISPOSAL OF SMALL QUANTITIES:
- If quantities are small, neutralize with soda ash and flush to drain with copious quantities of water, regulations permitting.
- Small quantities of waste material may be burned in an incinerator with an afterburner if approved methods and applicable regulations are followed.
- If the above methods are not practical, feasible, or in accord with existing regulations, contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

DISPOSAL OF LARGER AMOUNTS: Contact a licensed disposal company.
FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL

SECTION 4: HEALTH HAZARDS

Acetic anhydride has not been identified as a known or suspected carcinogen by the NTP, IARC, or OSHA.
Current OSHA PEL and ACGIH TLV: 8-hr. TWA: 5 ppm. (20 mg/m^3) (Ceiling level for ACGIH; OSHA PEL has no ceiling value.)

- Rat, Oral, LD_{50}: 1780 mg/kg
- Rat, Inhalation, LC_{100}: 2000 ppm/4 hrs.

- Acetic anhydride is corrosive to human tissue. Vapors can cause burns as well as irritation of the eyes; liquid contact can cause severe eye injury and severe burns to the skin, including blistering.

- Vapor inhalation is irritating and damaging to the respiratory passages and lungs, resulting in cough and possibly wheezing or bronchial spasm.

- Ingestion of this material most likely will result in severe burns of the mouth, throat, and stomach lining.

SECTION 5: FIRST AID PROCEDURES

Eye contact:
- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get prompt medical attention.*

Skin contact:
- Remove contaminated clothing promptly under a safety shower for gross exposure.
- Flush affected area with large amounts of water for 15 minutes. Then wash exposed areas of skin with soap and water.
- Get medical help when area of skin exposure is large or if irritation persists.*

Inhalation:
- Remove victim to fresh air; restore and/or support breathing as necessary. Have trained person administer oxygen.
- Keep victim warm and at rest. Get prompt medical attention.*

Ingestion:
- Get prompt medical attention.*
- Give several glasses of water to drink to dilute, and milk of magnesia to neutralize. Do not induce vomiting!
- Never give anything by mouth to a person who is unconscious or convulsing.

* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

SECTION 6: FIRE PROCEDURES AND DATA

- Extinguishing media: carbon dioxide, dry chemical for small fires; alcohol type of foam for large or unconfined fires.
- Use water with caution; acetic anhydride reacts with water.
- A water spray may be used to cool fire-exposed containers and disperse vapors. (20:1 ratio of water to this chemical is needed to solubilize to noncombustible mixtures and absorb heat of reaction with water.)
- The heavier-than-air vapors may flow along surfaces to distant sources of ignition and flash back.
- For major fires, or if large quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.

HAZARDOUS DECOMPOSITION PRODUCTS: may include carbon dioxide (CO_2), carbon monoxide (CO), various hydrocarbons.
FLASH POINT AND METHOD(S) ... 120°F (49°C) (CC)
AUTOIGNITION TEMPERATURE ... 734°F (392°C)
FLAMMABILITY LIMITS IN AIR (vol. %) : Lower ... 2.7 **Upper ...** 10.3

SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm) ... 284°F (140°C)
ABSOLUTE VISCOSITY (@ 20°C, cps) ... 0.90
VAPOR PRESSURE (@ 20°C, mm Hg) ... 4
VAPOR DENSITY (air = 1) ... 3.5
SOLUBILITY IN WATER (@ 20°C) ... Soluble (Reacts!)

SPECIFIC GRAVITY (20°/20°C) ... 1.083
MELTING POINT ... -99.6°F (-73.1°C)
MOLECULAR WEIGHT ... 120.1
EVAPORATION RATE (BuAc = 1) ... 0.46
% VOLATILE ... 100

DATA SOURCES: Genium's Industrial MSDS #434 (6/86) and references 1, 2, 4-12, 14, 18, 23, 25, 26, 31, 34, 47, 63, 81, 82, 84, 501, 506, 509-11.
(see glossary for titles)

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