

## References

- (1) U.S. Environmental Protection Agency, *Acenaphthene: Ambient Water Criteria*, Report PB 296-782, Washington, DC (1980).
- (2) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 4, No. 1, 38-41, New York, Van Nostrand Reinhold Co. (1984).

## ACENAPHTHYLENE

See "Polynuclear Aromatic Hydrocarbons."

## Acetaldehyde

**ACETALDEHYDE**

- Hazardous substance (EPA)
- Hazardous waste (EPA)

**Description:**  $\text{CH}_3\text{CHO}$ , acetaldehyde, is a flammable, volatile colorless liquid with a characteristic penetrating, fruit odor. It boils at  $20^\circ$  to  $21^\circ\text{C}$ .

**Code Numbers:** CAS 75-07-0 RTECS AB1925000 UN 1089

**DOT Designation:** Flammable liquid.

**Synonyms:** Acetic aldehyde, aldehyde, ethanal, ethyl aldehyde.

**Potential Exposure:** Acetaldehyde can be reduced or oxidized to form acetic acid, acetic anhydride, acrolein, aldol, butanol, chloral, paraldehyde, and pentaerythritol. It is also used in the manufacture of disinfectants, drugs (A-41), dyes, explosives, flavorings, lacquers, mirrors (silvering), perfume, photographic chemicals, phenolic and urea resins, rubber accelerators and antioxidants, varnishes, vinegar, and yeast. It is also a pesticide intermediate (A-32).

NIOSH estimates that 2,430 workers are exposed to acetaldehyde. Acetaldehyde is the product of most hydrocarbon oxidations; it is a normal intermediate product in the respiration of higher plants; it occurs in traces in all ripe fruits and may form in wine and other alcoholic beverages after exposure to air. Acetaldehyde is an intermediate product in the metabolism of sugars in the body and hence occurs in traces in blood. It has been reported in fresh leaf tobacco as well as in tobacco smoke and in automobile and diesel exhaust (A-5). It has been found in 5 of 10 water supplies surveyed by EPA with the highest concentrations in Philadelphia and Seattle at  $0.1 \mu\text{g}/\ell$  (A-2).

**Incompatibilities:** Strong oxidizers, acids, bases, alcohol, ammonia, amines, phenols, ketones,  $\text{HCN}$ ,  $\text{H}_2\text{S}$ .

**Permissible Exposure Limits in Air:** The Federal standard (TWA) is 200 ppm ( $360 \text{ mg}/\text{m}^3$ ); however, the ACGIH 1983/84 recommended TLV is 100 ppm ( $180 \text{ mg}/\text{m}^3$ ). The tentative STEL is 150 ppm ( $270 \text{ mg}/\text{m}^3$ ) and the IDLH level is 10,000 ppm.

**Determination in Air:** Acetaldehyde may be collected by impinger or fritted bubbler and then determined colorimetrically (A-8).

**Permissible Concentration in Water:** Human exposure to acetaldehyde probably antedates recorded history, inasmuch as acetaldehyde is the major metabo-

lite of ethyl alcohol. An additional source of widespread human exposure is tobacco smoke. The pharmacology and toxicology of acetaldehyde have been studied most extensively in its relationship to alcohol toxicity and human metabolism. Because of this background of human and laboratory experience, there appears to be no need to establish limits for acetaldehyde in drinking water (A-2). However, EPA (A-37) has set an ambient environmental goal of 2,480  $\mu\text{g}/\ell$  for acetaldehyde on a health basis.

**Routes of Entry:** Inhalation of vapor, ingestion.

**Harmful Effects and Symptoms:** *Local* — The liquid and the fairly low levels of the vapor are irritating to the eyes, skin, upper respiratory passages, and bronchi. Repeated exposure may result in dermatitis, rarely, and skin sensitization.

*Systemic* — Acute involuntary exposure to high levels of acetaldehyde vapors may result in pulmonary edema, preceded by excitement, followed by narcosis. It has been postulated that these symptoms may have been similar to those of alcohol, which is converted to acetaldehyde and acetic acid. Chronic effects have not been documented, and seem unlikely, since voluntary inhalation of toxicologically significant levels of acetaldehyde are precluded by its irritant properties at levels as low as 200 ppm (360  $\text{mg}/\text{m}^3$  of air).

**Points of Attack:** Respiratory system, lungs, skin, kidneys.

**Medical Surveillance:** Consideration should be given to skin, eyes, and respiratory tract in any preplacement or periodic examinations.

**First Aid:** If this chemical gets into the eyes, irrigate immediately. If this chemical contacts the skin, flush with water promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once and perform artificial respiration. When this chemical has been swallowed, get medical attention. Give large quantities of water and induce vomiting. Do not make an unconscious person vomit.

**Personal Protective Methods:** Wear appropriate clothing to prevent repeated or prolonged skin contact. Wear eye protection to prevent any possibility of eye contact. Employees should wash promptly when skin is wet. Remove clothing immediately if wet or contaminated to avoid flammability hazard. Provide eye-wash.

**Respirator Selection (A-4):**

- 1,000 ppm: CCROVF
- 5,000 ppm: GMOVc
- 10,000 ppm: GMOVfb/SAF/SCBAF
- Escape: GMOV/SCBA

**Disposal Method Suggested:** Incineration (A-31).

**References**

- (1) U.S. Environmental Protection Agency, *Chemical Hazard Information Profile: Acetaldehyde*, (Preliminary), Washington, DC (1979).
- (2) U.S. Environmental Protection Agency, *Acetaldehyde*, Health and Environmental Effects Profile No. 1, Washington, DC, Office of Solid Waste (April 30, 1980).
- (3) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 1, No. 1, 25-6, New York, Van Nostrand Reinhold Co. (1980).
- (4) See Reference (A-61).
- (5) See Reference (A-60).
- (6) U.S. Environmental Protection Agency, *Chemical Hazard Information Profile Draft Report: Acetaldehyde*, Washington, DC (April 29, 1983).

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formation Profile: Acet- alth and Environmental (April 30, 1980). Report, 1, No. 1, 25-6,

formation Profile Draft

- (7) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 3, No. 6, 23-27, New York, Van Nostrand Reinhold Co. (Nov/Dec. 1983).
- (8) Parmeggiani, L., Ed., *Encyclopedia of Occupational Health & Safety*, Third Edition, Vol. 1, pp 35-37, Geneva, International Labour Office (1983).

### ACETAMIDE

- Carcinogen (Animal Positive, IARC)(2)

Description:  $\text{CH}_3\text{CONH}_2$ , colorless crystals with a mousy odor, melting at  $81^\circ\text{C}$ .

Code Numbers: CAS 60-35-5 RTECS AB402500

DOT Designation: -

Synonyms: Acetic Acid Amide, Ethanamide.

Potential Exposure: Used as a solvent in molten state for many chemicals in plastics and chemical manufacturing.

Permissible Exposure Limits in Air: No standards set.

Permissible Concentration in Water: No criteria set; not very toxic to fish (A-36) but increases B.O.D. (1).

Harmful Effects and Symptoms: Is a mild irritant of low toxicity (1). However, IARC has determined it to be an animal positive carcinogen.

Personal Protective Methods: Self-contained breathing apparatus re- quired (1). Skin protection required.

Respirator Selection: See above.

Disposal Method Suggested: Add to alcohol or benzene as a flammable solvent and incinerate; oxides of nitrogen produced may be scrubbed out with alkaline solution.

#### References

- (1) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 1, No. 4, 20-21, New York, Van Nostrand Reinhold Co. (1981).
- (2) International Agency for Research on Cancer, *IARC Monographs on the Carcinogenic Risks of Chemicals to Humans*, 7, 197, Lyon, France (1974).
- (3) See Reference (A-63).
- (4) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 3, No. 6, 29-31 New York, Van Nostrand Reinhold Co. (Nov/Dec. 1983).

### ACETANILIDE

Description:  $\text{C}_6\text{H}_5\text{NHCOCH}_3$ , white crystals melting at  $113.5^\circ\text{C}$ .

Code Numbers: CAS 103-84-4 RTECS AD735000 UN

DOT Designation: -