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Dr. Robert M. Brink
Executive Secretary
Interagency Testing Committee
Environmental Protection Agency (TS-792)
Room 535, East Tower
401 M Street, SW
Washington, DC 20460

Dear Dr. Brink:

Reference: Propionaldehyde (CAS No. 123-38-6)

The Eastman Chemicals Division of Eastman Kodak Company wishes to comment on propionaldehyde, which appears on the 1987 List of Chemicals Selected for Review by the TSCA Interagency Testing Committee (ITC), as indicated in 52 FR 10409 dated April 1, 1987. This information responds to specific written questions identified to us by Dynamac Corporation on April 13, 1987.

This letter contains confidential information, enclosed in brackets, which is exempt from public disclosure pursuant to Section 552(b)(4) of Title 5 of the United States Code. A nonconfidential copy of this letter is enclosed and is also being provided to Dynamac Corporation.

1. Production Volume and Process Data:

Annual current and projected nonconfidential production range: 50-100 million pounds

[ ]

Propionaldehyde is manufactured using a continuous, enclosed reactor system via the aldol condensation route. The product is purified by continuous enclosed distillation.

2. Use Information

Approximately 95% [ ] is used internally to produce propanol and propanoic acid. Customer sales amount to 4% [ ] of the total propionaldehyde production. It is believed that the propionaldehyde sold to customers is used as a chemical intermediate.

Propionaldehyde is shipped in tank cars (95%), tank trucks (4%), and drums (1%).

3. Unpublished Toxicity Data

See enclosures consisting of our material safety data sheet and confidential unpublished toxicity reports. (The unpublished toxicity reports are enclosed only to Dr. Brink.)

4. Occupational Exposure Data

(a) Production

Potential exposure points are during sampling, analysis, loading and transferring propionaldehyde. Six to twelve workers are involved for periods of 5 to 30 minutes daily in these activities. Industrial Hygiene monitoring in 1984 and 1987 indicated worker exposure levels of 0.42 and 0.37 ppm (8 hr time weighted average) during loading operations, where potential exposure is normally the highest. Although normal air concentrations of propionaldehyde are quite low during operations, they can reach levels of 100 ppm or higher for short periods, for example, above a temporarily open tank car dome. Propionaldehyde vapor is highly irritating above approx. 50 ppm, which serves as a warning to leave the area or don respiratory protection. Workers are trained to use approved respiratory protection whenever working around appreciable propionaldehyde concentrations.

Propionaldehyde is typically produced 360 days per year. Worker exposure during limited maintenance of the processing equipment is minimized by draining and cleaning the equipment before work begins. Cleaning water is diluted and sent to the industrial waste water treatment system.

(b) Use

Potential exposure is insignificant during the conversion of propionaldehyde to propanol, since all transfers and operations are through closed systems, and process control sampling occurs only after essentially all of the propionaldehyde is converted to propanol. Potential worker exposure may occur, however, during sampling, analyzing, unloading and transferring propionaldehyde for the production of propionic acid. During a typical day, four to seven workers are involved in these activities for periods

of 5 to 20 minutes. These activities are performed 150 days per year. Very limited potential exposure exists during the sampling of the propionic acid process itself, since the propionaldehyde is essentially converted to propionic acid by this stage. Equipment is drained and flushed well with water before maintenance is performed, and the spent water is piped directly and diluted into the industrial waste water treatment system.

Another, small batch process that uses propionaldehyde [ ] has a potential exposure of two workers per day for a maximum of 45 minutes per day, 30 days per year. This potential exposure occurs while loading propionaldehyde by vacuum into a closed feed tank for chemical conversion. Workers wear fresh air masks, rubber gloves and plastic smock or raincoat during this operation.

5. Environmental Data

Eastman's equipment for manufacture and use of propionaldehyde is especially designed to minimize any atmospheric release. Waste streams from these processes are either incinerated or sent to an industrial waste water treatment system. Air emission controls include scrubber, vent condenser, and conservation vent.

Yours very truly,

R.D. Gerwe by D.W.K

R. D. Gerwe, Ph.D.
Senior Product Safety Representative
Material Safety Program

11/PS8579F

Enclosures

cc: Ms. Roberta Wedge - letter with MSDS only
Staff Scientist
Dynamac Corporation
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

MATERIAL SAFETY DATA SHEET

EASTMAN CHEMICAL PRODUCTS, INC.
Kingsport, Tennessee 37662

For Health Hazard Information, call: (615) 229-6094, 8am-5pm (Eastern), Mon.-Fri.
(615) 229-4374 at all other times

For other information, call: (615) 229-3229 Date of Preparation: 06-25-85

Form Approved by U. S. Department of Labor: Essentially Similar to OSHA-20

SECTION I. IDENTIFICATION

- Product Name: Propionaldehyde
- Synonym: Propanal
- Formula: C_3H_6O
- Molecular Weight: 58.08

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

A. COMPONENT:	Approx Percent	TLV	CAS Reg. No.
Propionaldehyde	100	None	123-38-6

B. PRECAUTIONARY LABEL STATEMENTS:

DANGER! EXTREMELY FLAMMABLE
HARMFUL IF INHALED
CAUSES BURNS

Keep away from heat, sparks, and flame.
Avoid breathing vapor.
Do not get in eyes, on skin, on clothing.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FIRST AID: If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Destroy contaminated shoes.

IN CASE OF FIRE: Use "alcohol" foam, dry chemical, CO_2, or water spray. Water may be ineffective in fighting the fire. Use water spray to keep fire-exposed containers cool.

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IN CASE OF SPILL: Eliminate all ignition sources. Use water spray to dilute spill to a nonflammable mixture. Use water spray to protect personnel attempting to stop the leak. Prevent runoff from entering drains, sewers, and streams. Emergency personnel should wear self-contained breathing apparatus (or air-supplied NIOSH-approved respirator).

Since emptied packages retain product residue, follow label warnings even after package is emptied.
Do not cut, drill, grind, or weld on or near this package.

SECTION III. PHYSICAL DATA

- Appearance and Odor: Colorless liquid; suffocating odor.
- Boiling Point: 48°C (118°F)
- Specific Gravity (H_2O = 1): 0.808 at 20°/20°F
- Vapor Pressure: 271 mm Hg at 20°C
- Percent Volatile by Volume: 100%
- Vapor Density (Air = 1): 2.0
- Evaporation Rate: Not determined.
- Solubility in Water: Appreciable.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- Flash Point: -27°C (-17°F)
  Method Used: Tag Closed Cup.
- Autoignition Temperature: 207°C (405°F); method used: ASTM D 2155
- Cool Flame Temperature: 165°C (330°F)
- Flammable Limits: LEL 2.6 at 89°F UEL 16.1 at 80°F
- Extinguishing Agent: "Alcohol" Foam, Dry Chemical, CO_2, or Water Spray
- Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Water may be ineffective for fire fighting. Water or foam may cause frothing. Use water spray to keep fire-exposed containers cool.
- Unusual Fire and Explosion Hazards: DANGER, EXTREMELY FLAMMABLE, VAPORS MAY CAUSE FLASH FIRE. Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back.

SECTION V. REACTIVITY DATA

- Stability: Unstable. Conditions to Avoid: In the presence of oxygen, may form peroxides or polymerize.
- Incompatibility: Oxidizing materials can cause a vigorous reaction.
- Hazardous Decomposition Products: As with any other organic material, combustion will produce carbon dioxide and probably carbon monoxide.
- Hazardous Polymerization: May occur. Conditions to Avoid: Contact with alkaline material. May polymerize with evolution of heat.

SECTION VI. TOXICITY AND HEALTH

A. EXPOSURE LIMITS

- OSHA Permissible Exposure Limit (PEL): Not established.
- Threshold Limit Value (TLV): Not established.

B. [redacted]

Inhalation: Vapor is irritating and in high concentrations may cause narcosis (sleepiness, dizziness, etc.) and lung injury.

Eyes: Liquid causes severe irritation.

Skin: Causes severe irritation.

C. FIRST AID

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention.

Eyes: Immediately flush with plenty of water for at least 15 min and get medical attention.

Skin: Immediately flush with plenty of water for at least 15 min while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy contaminated shoes.

D. TOXICITY DATA

Test	Species	Result	Toxicity Classification (1)
Acute oral LD_{50}	Rat	800 to 1600 mg/kg (2)	Slightly toxic
Acute oral LD_{50}	Mouse	800 to 1600 mg/kg (3)	
Dermal LD_{50}	Rabbit	5 mL/kg (2)	Practically nontoxic
Dermal LD_{50}	Guinea pig	10 to 20 mL/kg (2)	
Inhalation LC_{50}	Rat	26,000 ppm/0.5 h (2)	
Skin irritation	Guinea pig	Severe (2)	
Skin sensitization	Guinea pig	None (3)	
Eye irritation	Rabbit	Severe (2)	

Rats inhaled 90 ppm of propionaldehyde 6 h/day for 20 days with no obvious pathology, although 1300 ppm for 6 days produced hepatic damage. (2)

SECTION VII. PERSONAL PROTECTION AND CONTROLS

A. RESPIRATORY PROTECTION

An appropriate NIOSH-approved respirator for organic vapor should be worn if needed.

B. VENTILATION

General: Recommend at least 10 air changes per hour for good general room ventilation.

Local Exhaust: Recommended to control vapor.

C. SKIN AND EYE PROTECTION

Safety glasses should be worn in any type of industrial operation. Protective gloves should be worn. A face shield and an impermeable apron or smock should be worn to minimize skin contact.

D. OTHER CONTROL MEASURES

A safety shower, an eye bath, and washing facilities should be available. Wash thoroughly after handling. Keep container closed.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

Material is extremely flammable. Vapors may ignite explosively. Prevent buildup of vapors to explosive concentrations -- use only with cross-ventilation. Keep away from heat, sparks, and flame. Do not smoke; extinguish all flames and pilot lights; and turn off stoves, heaters, electric motors, and other sources of ignition when explosive concentrations of vapor are present or likely. Keep container closed. Do not cut, drill, grind, or weld on or near this package.

Since emptied packages retain product residue, follow label warnings even after package is emptied.

SECTION IX. SPILL, LEAK, AND DISPOSAL PRACTICES

Steps to be Taken in Case Material is Released or Spilled: Eliminate all ignition sources. Small spills may be collected with absorbent materials. For large spills, use water spray to dilute spill to a nonflammable mixture. Prevent runoff from entering drains, sewers, or streams.

Waste Disposal Method: Mix with compatible chemical which is less flammable and incinerate. Observe all federal, state, and local laws concerning health and environment.

SECTION X. ENVIRONMENTAL EFFECTS DATA

A. SUMMARY: Some laboratory data and published data are available for this product, and these data (3-6) have been used to provide the following estimate of environmental impact:

This product has a moderate biological oxygen demand, and it may cause oxygen depletion in aquatic systems. It has a low to moderate potential to affect aquatic organisms. This product is biodegradable and is not expected to persist in the environment. It is not likely to bioconcentrate. The direct, instantaneous discharge to a receiving body of water of an amount of this product which will rapidly produce by dilution a final concentration of 10 mg/L or less is not expected to have any adverse environmental impact. After dilution with a large amount of water, followed by secondary waste treatment, this product is not expected to have any adverse environmental impact.

B. OTHER PERTINENT DATA

- ThOD: 2.20 g/g (3)
- COD: 97% of ThOD (4)
- BOD$_5$: 38% of ThOD (4)
- BOD: Using activated sludge acclimated at 20°C for 20 days and a feed of 335 mg/L: 95% removed in 1(0-5 days (4)

C. ACUTE AQUATIC EFFECTS

- 96-h LC$_{50}$; Bluegill sunfish: 130 ppm (4,5)
- 96-h LC$_{50}$; Tidewater silverside: 130 ppm (4,5)

D. BIOCONCENTRATION POTENTIAL

- Octanol/water partition coefficient: log P = 0.59; P = 3.9 (6)

SECTION XI. TRANSPORTATION

DOT Hazard Classification: Flammable liquid.

SECTION XII. REFERENCES

1. H. C. Hodge and J. H. Sterner. Tabulation of toxicity classes. Am. Ind. Hyg. Assoc. Q. 1949; 10:93-96.

2. G. D. Clayton and F. E. Clayton, "Vitors. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition, Volume 2A. New York, Wiley-Interscience, 1981, pp. 2637, 2642, 2647.

3. Unpublished data, Health and Environment Laboratories, Eastman Kodak Co., Rochester, New York.

4. K. Verschueren. Handbook of Environmental Data on Organic Chemicals, 2nd Edition. New York, Van Nostrand Reinhold Company, 1983, pp. 1021-1023.

5. G. W. Dawson, A. L. Jennings, D. Drozdowski, and E. Rider. The acute toxicity of 47 industrial chemicals to fresh and saltwater fishes. J. Hazardous Mater. 1975/77; 1(4):303-318.

6. A. J. Leo and C. Hansch, Editors. Chemical Parameter Data Base. Medicinal Chemistry Project, Pomona College, Seaver Chemistry Laboratory, Claremont, California, June 23, 1985.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

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B. OXYGEN DEMAND DATA

- ThOD: 2.20 g/g (3)
- COD: 97% of ThOD (4)
- BOD_5: 38% of ThOD (4)
- BOD: Using activated sludge acclimated at 20°C for 30 days and a feed of 333 mg/L: 95% removed in 1/3-5 days (4)

C. ACUTE AQUATIC EFFECTS

- 96-h LC_{50}; Bluegill sunfish: 130 ppm (4,5)
- 96-h LC_{50}; Tidewater silversides: 100 ppm (4,5)

D. BIOCONCENTRATION POTENTIAL

- Octanol/water partition coefficient: Log P = 0.59; P = 3.9 (6)

SECTION XI. TRANSPORTATION

DOT Hazard Classification: Flammable liquid.

SECTION XII. REFERENCES

1. H. C. Hodge and J. H. Sterner. Tabulation of toxicity classes. Am. Ind. Hyg. Assoc. Q. 1949; 10:93-96.

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AMTEK CORP.

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