

3-Methoxypropylamine

Document History

Published: 1996

Revised: 2001

Revised: 2009

Rebranded: 2025

This OEL was originally established in 1996 and updated in 2001. A literature search to identify new toxicity information for 3-Methoxypropylamine was performed in August 2008. No new studies or data relevant to the OEL were identified.

I. IDENTIFICATION

Chemical Name: 1-propanimine, 3-methoxy

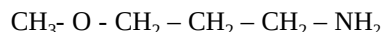
Common Name: Methoxypropylamine

Synonyms: 3-methoxypropylamine; MPA

CAS Number: 5332-73-0

Molecular Formula: $C_4H_{11}NO$

Structural Formula:



II. CHEMICAL AND PHYSICAL PROPERTIES⁽¹⁾

Physical State and Appearance: Colorless liquid

Odor Description: Ammonia-like

Odor Threshold: $ED_{10} = 0.2 \text{ ppm}^*$

$ED_{50} = 2.7 \text{ ppm}$

$ED_{90} = 42 \text{ ppm}^{(2)}$

Molecular Weight: 89.14

Specific Gravity: 0.873 at 20°C (68°F)

Conversion Factors: $1 \text{ ppm} = 3.6 \text{ mg/m}^3$

$1 \text{ mg/m}^3 = 0.27 \text{ ppm}$

Vapor Density (Air = 1): 3.1

Boiling Point: 119°C (246°F)

Vapor Pressure: 6 mmHg at 20°C (68°F)

Saturated Vapor Concentration: 7900 ppm at 20°C (68°F)

Flammability Limit: Lower explosive limit — 0.8% (calculated);

Upper explosive limit — Not determined

Flash Point (tag closed cup): 26.6°C (80°F)

Autoignition Temperature: Not determined

Solubility in Water: Completely soluble in water and common organic solvents.

Stability: Stable at ambient temperatures.

? ED = effective dilution at which stated percentage of people will detect odor

Reactivity and Incompatibilities: Undergoes reaction typical of primary amines and reacts with strong mineral acids, strong oxidizing agents, and isocyanates.

III. USES

Corrosion inhibitor in boiler/steam systems. Used in preparation of amine soaps, and useful for making dispersions and emulsions in floor finishes, textile finishes, and water-based paints.⁽³⁾

IV. ANIMAL TOXICITY DATA

A. Acute Toxicity

1. Oral Toxicity

Rats: $LD_{50} = 690\text{--}1600 \text{ mg/kg}^{(1,3,4)}$

Mice: $LD_{50} = 800\text{--}1600 \text{ mg/kg}^{(4)}$

2. Eye Toxicity

Rabbits : 3 L of air per minute were passed over MPA heated to 50°C (122°F) and the vapors were allowed to contact the rabbit eye for one min. Moderate to severe conjunctival irritation and some corneal injury were noted in 3 hrs. After three days the cornea was clear; however, surrounding tissues were still irritated.⁽⁴⁾

Rabbits: primary eye irritation; liquid caused extreme irritation.⁽³⁾

3. Skin Toxicity

a. Absorption

Rabbits: $LD_{50} = 2600 \text{ mg/kg}^{(3)}$

Guinea pigs: $LD_{50} = 1\text{--}5 \text{ mL/kg}^{(4)}$

Guinea pigs: LD_{50} (50% aqueous solution) = 2.5–5.0 mL/kg as amine⁽⁴⁾

b. Irritation

Guinea pigs: moderate to gross edema and Necrosis⁽⁴⁾

Rabbits: severely irritating; DOT corrosivity test — corrosive⁽³⁾

c. Sensitization

Guinea pigs: positive in a delayed contact hypersensitivity study using the Buehler test.⁽⁵⁾

4. *Inhalation Toxicity*

Rats: 6 hr at -11,500 ppm; 2/3 deaths in 1 day⁽⁴⁾

Rats: 6-hr exposure to a substantially saturated vapor (dynamic) at 24°C (75°F) — no deaths; concentration not specified but calculated to be 18,000 ppm at 24°C (75°F).⁽⁶⁾

Mice: 6-hr exposure at 150 ppm — no deaths and very minor breathing difficulty in 1 of 4 animals.⁽⁷⁾

5. *Other Toxicity*

Intraperitoneal Injection (10% Solution):

Rats: LD₅₀ = 25 mg/kg⁽⁶⁾

Mice: LD₅₀ = 50 mg/kg⁽⁶⁾

B. Subacute Toxicity

No data available.

C. Chronic Toxicity/Carcinogenicity

No data available.

D. Subchronic Toxicity

No data available.

E. Reproductive/Developmental Toxicity

No data available.

F. Genotoxicity

Ames Test: negative; no additional information available.⁽⁵⁾

Unscheduled DNA Synthesis

(UDS) Assay: negative⁽⁵⁾

Micronucleus Test: negative.⁽⁵⁾

G. Metabolism/Pharmacokinetics

No data available.

V. HUMAN USE AND EXPERIENCE

Methoxypropylamine has the potential to cause eye burns, skin irritation, and allergic skin reactions.⁽³⁾ One manufacturer reports that it has no evidence of either skin sensitization or hazy vision resulting from exposure to methoxypropylamine, although other organic amines reportedly cause both effects.⁽⁸⁾

VI. RATIONALE

High vapor concentrations of methoxypropylamine are potentially irritating to the eyes and respiratory system, effects that are seen with other aliphatic amines. Because there is a lack of Exposure data to identify the threshold of irritation in humans, this OEL is based on analogy to the American Conference of Governmental Industrial Hygienists (ACGIH®) Threshold Limit Values (TLVs®) for other aliphatic amines to prevent eye and upper respiratory irritation.⁽⁹⁾

Chemical	TLV®-TWA	STEL	Established
Diethylamine	5 ppm (skin)	15 ppm (skin)	1994
Dimethylamine	5 ppm	15 ppm	1992
Ethylamine	5 ppm (skin)	15 ppm (skin)	1994
Isopropylamine	5 ppm	10 ppm	1976
Triethylamine	1 ppm (skin)	5 ppm (skin)	1994
Trimethylamine	5 ppm	15 ppm	1992

VII. RECOMMENDED OEL GUIDE

8-hr time-weighted average (TWA): 5 ppm ; 15- min TWA : 15 ppm

VIII. REFERENCES

1. **Texaco Chemical Company:** 75824 Methoxypropylamine (Material Safety Data Sheet). Houston, TX: Texaco Chemical Company, 1992.
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3. Texaco Chemical Company: Methoxypropylamine. [Product Bulletin.] Houston, TX: Texaco Chemical Company, 1993.
4. **Eastman Kodak Company:** "3-Methoxy-n-Propylamine, Toxicity Studies." [Letter.] Corporate Health and Environment Laboratories, Rochester, NY: Eastman Kodak Company, July 22, 1994.
5. **Texaco Chemical Company:** "Methoxypropylamine" (Document No. 89-910000256). [Correspondence to U.S. Environmental Protection Agency, Office of Toxic Substances, Section 8(e) Coordinator: follow-up information from Texaco Inc., with attached MSDS and dermal sensitization studs'.] Beacon, NY: Texaco Chemical Co., August 9, 1991.
6. **Union Carbide Corporation:** "3-Methoxypropylamine. Acute Inhalation Study" (Project Report 45-93). [Unpublished Information.] Danbury, CT: Union Carbide Corporation, June 8, 1992.
7. **U.S. Department of Army (Woodard Research Corporation):** "3-Methoxypropylamine, 3-MPA" (Report). August 3, 1965.

8. **Texaco Chemical Company:** “Methoxypropylamine. Toxicity Reports.” [Personal Communication to the AIHA Workplace Environmental Exposure Level Committee.] Houston, TX: Texaco Chemical Company, December 1, 1982.
9. **American Conference of Governmental Industrial Hygienists (ACGIH®):** 1994–1995 Threshold Limit Values® for Chemical Substances and Physical Agents and Biological Exposure Indices®. Cincinnati, OH: ACGIH®, 1994.