N-Nitrosomorpholine

59-89-2

Hazard Summary

N-Nitrosomorpholine is not used commercially in the United States. Limited information is available on the health effects of N-nitrosomorpholine. No information is available on the acute (short-term), chronic (long-term), reproductive, developmental, or carcinogenic effects of N-nitrosomorpholine in humans. Animal studies have reported effects on the liver from chronic exposure as well as tumors of the liver, nasal cavity, lung, and kidneys from oral exposure to N-nitrosomorpholine. EPA has not classified N-nitrosomorpholine for carcinogenicity. The International Agency for Research on Cancer (IARC) has classified N-nitrosomorpholine as a Group 2B, possible human carcinogen.

Please Note: The main sources of information for this fact sheet are the Hazardous Substances Data Bank (HSDB) (1), a database of summaries of peer-reviewed literature, and the IARC monographs on chemicals carcinogenic to humans. (3)

Uses

• N-Nitrosomorpholine is not used commercially in the United States. (3)

Sources and Potential Exposure

- N-Nitrosomorpholine was detected as an airborne contaminant inside some cars; levels ranging from trace to 2.5 grams per cubic meter (g/m³) were detected. (1)
- N-Nitrosomorpholine has been found in rubber-stoppered blood collection tubes. (1)

Assessing Personal Exposure

• No information is available on the assessment of personal exposure to N-nitrosomorpholine.

Health Hazard Information

Acute Effects:

- No information is available on the acute effects of N-nitrosomorpholine in humans.
- Tests involving acute exposure of rats have shown N-nitrosomorpholine to have moderate to high acute toxicity from oral exposure. (2)

Chronic Effects (Noncancer):

- No information is available on the chronic effects of N-nitrosomorpholine in humans.
- Animal studies have reported effects on the liver from chronic exposure to N-nitrosomorpholine. (1,3)
- EPA has not established a Reference Concentration (RfC) or a Reference Dose (RfD) for Nnitrosomorpholine.

Reproductive/Developmental Effects:

• No information is available on the reproductive or developmental effects of N-nitrosomorpholine in humans or animals.

Cancer Risk:

- No information is available on the carcinogenic effects of N-nitrosomorpholine in humans.
- Animal studies have reported tumors of the liver, lung, nasal cavity, and kidneys from oral exposure to N-nitrosomorpholine. (1,3-5)
- EPA has not classified N-nitrosomorpholine for carcinogenicity.
- The IARC has classified N-nitrosomorpholine as a Group 2B, possible human carcinogen. (3)
- The California E n vironmental Protection Agency (CalEPA) has calcula t ed an inhalation unit risk factor of 0.0019 ($\mu g/m$)³ and an oral cancer slope factor of 6.7 (mg/kg/d)⁻¹(4)

Physical Properties

- N-Nitrosomorpholine exists as yellow crystals. (1,3)
- The chemical formula for N-nitrosomorpholine is $C_4 H_8 N_2 O_2$, and the molecular weight is 116.1 g/mol. (3)

Note: There are very few health numbers or regulatory/advisory numbers for N-nitrosomorpholine; thus, a graph has not been prepared for this compound. The health information cited in this fact sheet was obtained in December 1999.

Conversion Factors:

To convert concentrations in air (at 25°C) from ppm to mg/m³: mg/m³ = (ppm) × (molecular weight of the compound)/(24.45). For N-nitrosomorpholine: 1 ppm = 4.7 mg/m³. To convert concentrations in air from μ g/m³ to mg/m³ : mg/m³ = (μ g/m³) × (1 mg/1,000 μ g).

References

Summary created in April 1992, updated in January 2000

- 1. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
- 2. U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
- 3. International Agency for Research on Cancer (IARC). IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Volume 17. World Health Organization, Lyon. 1978.
- 4. California Environmental Protection Agency. Air Toxics Hot Spots Program Risk Assessment Guidelines: Part II. Technical Support Document for Describing Available Cancer Potency Factors. Office of Environmental Health Hazard Assessment, Berkeley, CA. 1999.
- 5. U.S. Department of Health and Human Services (DHHS). The 8th Report on Carcinogens. 1998 Summary. Public Health Service, National Toxicology Program. 1998.