1,3-Butadiene

This document provides a brief description of 1,3-Butadiene, its uses, and the potential hazards associated with short and long term exposure. Environmental impact information for accidental releases is included. This information is general in nature and is not intended as a replacement for the safety data sheet (SDS), product label and other safe handling literature. For additional information consult the LANXESS safety data sheet.

Identification

Product Name: 1,3-Butadiene
Chemical Name: 1,3-Butadiene
Synonym(s): Biethylene
Bivinyl
Butadiene
CAS Number: 106-99-0

Description

Overview: 1,3-Butadiene is a colorless gas at ambient temperatures with a strong, gasoline-like odor. Commercially produced 1,3-Butadiene is shipped as a liquefied compressed gas.

Uses: 1,3-Butadiene vapors are formed as a byproduct of natural and man-made combustion processes, but the chemical is also extracted from petroleum and natural gas feedstocks for commercial purposes. The intended application of 1,3-Butadiene produced by LANXESS is for use as an ingredient in the production of synthetic rubbers and plastics.

Properties:

Freezing Point: -164.2°F (-109°C) at 760 mmHg
Boiling Point: 23°F (-5°C)
Flash Point: -104.8°F (-76°C)
Solubility in Water: Slight
Potential Human Health Effects

Occupational Exposure
Potential for occupational exposure to 1,3-Butadiene exists through inhalation, skin or eye contact at transloading, unloading, storage and staging areas; and during sampling or maintenance operations. Because of its volatility, 1,3-Butadiene is typically produced and used in closed manufacturing processes by trained personnel, substantially minimizing the potential for exposure.

Employee Training
Workers handling 1,3-Butadiene are trained to implement proper handling procedures and to understand the potential health and physical hazards of this product. A NIOSH approved positive pressure air-supplied respirator is recommended for transloading, unloading and other operations not contained within a closed system when airborne concentrations are not known or exceed the recommended exposure limit. In addition, LANXESS recommends that goggles, long-sleeved shirts, long pants and gloves be worn when handling 1,3-Butadiene. Material handlers should be included in a medical surveillance program.

Consumer Exposure
LANXESS does not sell 1,3-Butadiene to the general public. The chemical is a byproduct of incomplete combustion processes (from forest fires, tobacco smoke, vehicle emissions, etc.) and is commonly present in the environment. The primary source of exposure for consumers is through inhalation of ambient and indoor air, with smokers exposed to higher levels.

Short-Term Health Effects
Toxicity from short-term exposure to 1,3-Butadiene is low.
Inhalation of 1,3-Butadiene may result in respiratory tract irritation with symptoms of coughing, sore throat and runny nose. Eye contact can be irritating with symptoms of redness, tearing, stinging or swelling. Rapidly expanding gas or liquid vapors may cause frostbite with symptoms including loss of skin color, blurred vision and pain, followed by numbness and—in severe cases—burns or blisters. Ingestion of 1,3-Butadiene may induce abdominal pain, nausea, vomiting, diarrhea, fatigue, dizziness, or unconsciousness.
Inhaling sufficient quantities of 1,3-Butadiene may cause nervous system effects with symptoms of headache, dizziness, numbness, flushing, lack of coordination, confusion, hypotension (low blood pressure) or tachycardia (increased heart rate).

Long-Term Health Effects
Long-term or repeated exposure to 1,3-Butadiene may result in blood disorders or damage to the kidneys, liver, lungs or brain. The U.S. Environmental Protection Agency (EPA) classifies 1,3-Butadiene as carcinogenic to humans through inhalation exposure, and the International Agency for Research on Cancer (IARC) classifies the chemical as a probable human carcinogen (Group 2A).
Reproductive and genetic effects have been observed in animals.
Physical Hazards

1,3-Butadiene is volatile, extremely flammable and heavier than air. Concentrated vapors or mists may present a fire or explosion hazard, and explosive reactions may occur in contact with copper, metal oxides and other strong oxidizers. Exposure to heat, open flames and other potential sources of ignition must be avoided. Avoid exposure to light.

Potential Environmental Impact

1,3-Butadiene typically enters the environment as a vapor byproduct of combustion, although fugitive and stack emissions from manufacturing processes also play a role. Since 1,3-Butadiene oxidizes rapidly it is not expected to persist in the environment or accumulate in biological tissues. Accidental releases in liquid form may pose a danger to fish (slight toxicity), invertebrates (slight toxicity) and plants (slight toxicity) prior to evaporation or biodegradation.

Conclusion

Under normal conditions of anticipated use as described in this Product Safety Assessment, and if the recommended safe use and handling procedures are followed, 1,3-Butadiene is not expected to pose a significant risk to human health or the environment.

References

Concise International Chemical Assessment Document (CICAD) 30, International Programme on Chemical Safety (IPCS)

Integrated Risk Information System - 1,3-Butadiene, Environmental Protection Agency (EPA)

International Chemical Safety Card, International Programme on Chemical Safety (IPCS)

Safety Data Sheet (SDS), 1,3-Butadiene, LANXESS Corporation

MedlinePlus Medical Encyclopedia, U.S. National Library of Medicine and the National Institutes of Health

The Registry of Toxic Effects of Chemical Substances #EI9275000, National Institute for Occupational safety and Health (NIOSH)

ToxNet Hazardous Substances Data Bank, U.S. National Library of Medicine, National Institutes of Health and the U.S. Department of Health and Human Services
Contact Information

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Notices

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