

Michigan Department of Natural Resources and the Environment
Interoffice Communication

TO: File for Lithium hexafluorophosphate (CAS #21324-40-3)

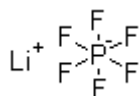
FROM: Doreen Lehner, Toxics Unit, Air Quality Division

SUBJECT: Screening Level for Lithium hexafluorophosphate (CAS #21324-40-3)

DATE: September 7, 2010

The initial threshold screening level (ITSL) for lithium hexafluorophosphate (CAS #21324-40-3) is 0.1 µg/m³ based on an annual averaging time.

Lithium hexafluorophosphate (MW 151.9) is a white crystalline powder that has a high solubility in nonpolar solvents, specifically propylene carbonate with dimethoxyethane. Lithium hexafluorophosphate anion is inert toward strong reducing agents, such as lithium metal and makes this compound useful as an electrolyte in lithium batteries.



A literature review was conducted to determine an initial threshold screening level (ITSL) for lithium hexafluorophosphate. The following references and databases were searched to derive the above screening level: EPBCCD, United States Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and Biological Exposure Indices (TLV/BEI) 2008 guide, National Toxicology Program (NTP) Study Database, International Agency for Research on Cancer (IARC), Acute Database, Chemical Abstract Service (CAS) Online, National Library of Medicine (NLM)-online, EPA Aggregated Computational Toxicology Resource (ACToR) Database, US EPA TSCATS database, and Hazardous Substances Data Bank (HSDB).

There is no toxicity data available for lithium hexafluorophosphate. RfC or RfD values were unavailable. There is no NIOSH recommended exposure limit data available or a threshold limit value from ACGIH. There are also no 7-day inhalation studies for lithium hexafluorophosphate, which would give a NOAEL or LOAEL and no acute inhalation studies which would give an LC₅₀. Data on other lithium compounds are available and it has been found that pH is a factor in lithium toxicity. Lithium can be absorbed through the oral route and is almost completely absorbed from the gastrointestinal tract,

absorption is dependent on the solubility of the salt. Lithium may also be absorbed via the lungs, while the absorption of lithium through the skin is considered to be very poor. Once absorbed lithium is widely distributed in the tissues with higher accumulations in the bone and endocrine glands (thyroid, pituitary, and adrenal). Lithium can substitute for sodium or potassium in several transport proteins, thus providing a pathway for lithium entry into cells. Lithium is mainly excreted via the kidneys, but elimination of lithium decreases drastically in individuals with a low sodium balance. Lithium and some lithium compounds (e.g. lithium hydride and lithium hydroxide) are irritating and corrosive to the respiratory tract, eyes and skin at low air levels due to alkalinity (Lagerkvist et al., 2002).

Based on Rule 232 (1) (i) the ITSL is set at the default of $0.1 \mu\text{g}/\text{m}^3$. According to Rule 232 (2) (c), the averaging time is annual.

Based on the above data, the ITSL for lithium hexafluorophosphate is $0.1 \mu\text{g}/\text{m}^3$ based on an annual averaging time.

References:

Act 451 of 1994, Natural Resources and Environmental Protection Act and Air Pollution Control Rules, Michigan Department of Environmental Quality.

Lagerkvist B.J., and Lindell B. 2002. 131. Lithium and lithium compounds. The Nordic Expert Group for Criteria Documentation of Health Risk from Chemicals. Nordic Council of Ministers. NR 2002:16. ISBN 91-7045-659-3.

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