

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Mesityl oxide file (CAS # 141-79-7)

FROM: Gary Butterfield

SUBJECT: Screening level for Mesityl oxide

DATE: March 17, 2008

Mesityl oxide is also known as 2-methyl-2-penten-4-one. Mesityl oxide is a liquid. The molecular formula is $C_6H_{10}O$. The molecular weight is 98.2 g/mol. The melting point is -59C, and the boiling point is 130C. The vapor pressure is 8.2 mmHg at 25C.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - Feb 2008), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on Feb. 13, 2007. There are a few published toxicity studies with mesityl oxide; however, they are of relatively short term (acute or a couple of weeks duration) and conducted many years ago.

There is an established ACGIH TLV of 15 ppm or 60 mg/m³, and a NIOSH REL of 10 ppm or 40 mg/m³ for mesityl oxide. Both of these occupation exposure levels (OEL) are considered to be protective of eye and respiratory tract irritation. The NIOSH documentation had some concern for mesityl oxide being a heavier molecular weight compared to other ketones, and the liver and kidney effects that were observed in a few of the repeated exposure studies in animals with high exposure doses. These issues have led NIOSH to come up with the lower REL. These OELs have been set to protect workers from toxic effects from relatively long term exposure.

The hierarchy of R232's basis for setting a screening level suggests that use of OEL values should take precedence over use of short-term exposure studies in setting a screening level. Therefore the screening level will be based on the NIOSH REL of 10 ppm or 40 mg/m³ under R 232(1)(c), as follows.

$$\text{ITSL} = \frac{40 \text{ mg/m}^3}{100} = 400 \text{ ug/m}^3 \text{ with 8-hour average}$$

References:

ACGIH. 1991. Documentation of the threshold limit values (TLV) and biological exposure indices (BEI).

NIOSH. 1978. NIOSH criteria for a recommended standard. Occupational exposure to ketones. 78-173

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