

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Isobutyl methacrylate file (CAS # 97-86-9)

FROM: Gary Butterfield

SUBJECT: Screening level for Isobutyl methacrylate

DATE: February 16, 2006

Isobutyl methacrylate is a colorless liquid at ambient temperatures. It is not very water soluble. The molecular formula is  $C_8H_{14}O_2$ . The molecular weight is 142.2 g/mol. The boiling point of isobutyl methacrylate is 155C. The vapor pressure has been reported to be 3.09 mmHg at 25C. This material is one of the EPA high production volume chemicals.

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 - Jan 2006), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on January 31, 2006, to evaluate recent published literature. This material has not been well tested for toxicity. There are some injection dose studies available, which are not of use for calculating a screening level. The search located three acute toxicity studies that could be used to develop a screening level – one oral, and two inhalation studies.

The mouse oral LD50 study reported by Tanii and Hashimoto (1982) reported the LD50 of 11.8 g/kg in male ddY mice. The mice weighed 24 to 27 grams. There were at least 4 dose groups of 4 mice per dose group used. The LD50 was calculated by the method of Weil.

The first acute inhalation toxicity study was conducted by Lawrence et al (1974). Male ICR mice were exposed to various concentrations for various durations of time. The 29740 mg/m<sup>3</sup> exposure for 4.8 hours was reported to result in 50% of the exposure group to die during the 7-day observation period. The LC50 was reported in this study to be calculated by the method of Weil.

In an unpublished acute inhalation toxicity study reported by IRDC (1975), groups of 5 male and 5 female Charles River CD rats were exposed to either 2 mg/L or 200 mg/L (that is 2000 or 200000

mg/m<sup>3</sup>) for 4 hours that was followed by a 14 day observation period. None of the rats exposed to 2 mg/L died. In the 200 mg/L group, 8 of 10 rats died either during the 4-hour exposure or with in the first three hours post-exposure. There was no LC50 determined from this report.

It is generally considered to be preferable to use an inhalation study, rather than an oral study to develop the inhalation screening level. In this case, the Lawrence et al LC50 provides the best basis to be used to calculate the ITSL. The ITSL can be calculated from that 4-hour LC50, by use of the equation from R232(1)(f). The 4.8-hour exposure in the Lawrence et al is considered to be close enough to the typical 4-hour exposure duration required for use of this equation. The ITSL is calculated as follows.

$$\text{ITSL} = \frac{29740 \text{ mg/m}^3}{500 \times 100} = 600 \text{ ug/m}^3 \text{ with annual averaging}$$

References:

IRDC. 1975. Acute inhalation toxicity in the albino rat AR 85124 isobutyl methacrylate. GE Corp Feb 14, 1992 submittal to TSCA 8(e). EPA doc # OTS 0535667.

Lawrence et al. 1974. Development of a toxicity evaluation program for dental materials and products. II Screening for systemic toxicity. J Biomed Mater Res 8:11-34.

Tanii and Hashimoto. 1982. Structure-toxicity relationship of acrylates and methacrylates. Toxicol Lett 11:125-129.