

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES**

INTEROFFICE COMMUNICATION

JANUARY 31, 1995

TO: File for Methyl Acetate (79-20-9)  
FROM: Marco Bianchi  
SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for methyl acetate is 6,100  $\mu\text{g}/\text{m}^3$  based on a 8 hr. averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, HEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, CAS-online, NLM-online, IARC, NIOSH Pocket Guide, and ACGIH Guide.

Information on methyl acetate was obtained from many sources. This compound is used in industry as a lacquer solvent, flavoring agent, and is a major component of methyl acetone. RTECS listed many toxicity studies with different routes of exposure, but these data could not be used to develop an ITSL. Information obtained from ACGIH documentation listed an oral  $\text{LD}_{50}$  study in rabbits of 3700 mg/kg. Cats exposed at 5000 ppm methyl acetate experienced ocular irritation and salivation within 20 minutes, while inhaling 54,000 ppm was lethal within 1 to 9 minutes.

Currently, both NIOSH and ACGIH have developed occupational exposure limits of 200 ppm for methyl acetate. ACGIH documentation has shown high concentrations of methyl acetate in humans caused irritation of the upper and lower respiratory passages, and eyes.

In the HEAST manual, EPA lists a chronic and subchronic RfD for methyl acetate of 1.0 mg/kg, and 0.1 mg/kg, respectfully. EPA bases the RfD on data obtained with methanol, and multiplying the molecular weight ratio of methyl acetate/methanol. This 90 day oral gavage rat study resulted in a NOEL of 1156 mg/kg/day. Critical effects included increased alkaline phosphatase and SGPT suggesting the target organ as the liver.

Normally, data from the HEAST manual would be sufficient to derive an ITSL. But after reviewing an earlier ITSL memorandum on methanol written by AQD staff, it was determined that information provided by HEAST may not be the most appropriate to use. This memo stated that it may be erroneous to convert methanol oral data to an inhalation value based on a comparison study between a rat  $\text{LD}_{50}$  (6 g/kg) to a rat  $\text{LC}_{50}$  (90 g/kg). Another rat study showed differences in measured concentrations of methanol in blood and urine after ingesting or inhaling methanol. The memo also asserted that toxicity data from non-primate animals may not be relevant to develop an ITSL for protection of human health. Non-primates are known to metabolize methanol using a catalase peroxidase pathway to carbon dioxide, whereas humans and primates metabolize methanol by alcohol dehydrogenase to formic acid. It is the increased blood formic acid that is associated with methanol's ocular effects. These issues led to the conclusion that in order to have a great deal of confidence in the ITSL, it must be based on human inhalation exposure data.

The ACGIH reported that no cases of irritation or systemic injury has been reported from industrial exposures below 200 ppm. ( $610 \text{ mg}/\text{m}^3$ ), and thus set the TLV at this level. This value will be used to derive the ITSL.

The ITSL was derived as follows:

$$\text{ACGIH TLV} = 610 \text{ mg/m}^3$$

$$610 \text{ mg/m}^3 \div 100 = 6.1 \text{ mg/m}^3$$

$$6.1 \text{ mg/m}^3 \times \frac{1000 \text{ ug/m}^3}{1 \text{ mg/m}^3} = 6100 \text{ ug/m}^3$$

The ITSL for methyl acetate = 6,100  $\mu\text{g/m}^3$  based on 8 hr. averaging.

**References:**

ACGIH. 1994. Documentation of the TLV's and BEI's.

MDNR. 1992. Interoffice communication memorandum for methanol.

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