

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

February 13, 2003

TO: Methyldimethoxysilane File (CAS #16881-77-9)
FROM: Marco Bianchi, Air Unit, Environmental Science and Services Division (ESSD)
SUBJECT: Initial Threshold Screening (ITSL) Level for methyldimethoxysilane

The ITSL for methyldimethoxysilane is $92 \mu\text{g}/\text{m}^3$ based on an annual averaging time.

The following references or databases were searched to identify data to determine the ITSL: Integrated Risk Information System, Health Effects Assessment Summary Tables, National Toxicology Program Management Status Report - online, Registry for Toxic Effects of Chemical Substances (RTECS), Michigan Department of Environmental Quality's Chemical Criteria Database, EPB library, Chemical Abstract Service (CAS) - online, National Library of Medicine - online, International Agency for Research on Cancer - online, National Institute for Occupational Safety and Health Pocket Guide, and the American Conference of Governmental and Industrial Hygienists Guide.

A review of the above databases found limited toxicological information on methyldimethoxysilane. RTECS listed a rat LD_{50} of 5.6 ml/kg and a rabbit LD_{50} of 1.78 ml/kg. An abstract obtained from Toxline, provided additional information on the rat LD_{50} value. Rats, 2 or 5 animals/sex/group were orally dosed with methyldimethoxysilane at 0.5, 2.0, 4.0, or 8.0 ml/kg resulting in an LD_{50} of 5.66 ml/kg. Additional information was found in this abstract regarding an acute inhalation exposure of rats (5/sex/group) for 1 hour at 150 or 300 ppm. These concentrations did not lead to deaths or other systemic effects at two weeks post-treatment.

Other than the limited toxicity information provided in RTECS, the only study available that provided data to derive an ITSL was a proprietary, 4-hour acute inhalation rat study submitted by Dow Corning. In this study, two groups of Sprague-Dawley rats (each group consisting of 5 females and 5 males) received a 4-hr exposure to 0 and 4.6 m/L vapor of the test material. Rats were weighed prior to initiation of exposures and on days 7 and 14 following the exposures. All surviving animals were euthanized on day 14 and a necropsy was performed. No mortality or apparent abnormalities were observed in the control or test group animals during the exposure or observation periods. Body weight analysis did not reveal any test material related effects.

A median lethal concentration (LC_{50}) was not determined, as no mortalities occurred at the highest dose level. However, the results suggest that a 4-hr LC_{50} for methyldimethoxysilane would be $>4.6 \text{ mg}/\text{L}$. This value will be used as a surrogate LC_{50} to derive an ITSL.

The ITSL was derived as follows:

$$\text{LC}_{50} = 4.6 \text{ mg}/\text{L}$$

Conversion of mg/L to mg/m³

$$4.6 \text{ mg/L} \times \frac{1000 \text{ L}}{1 \text{ m}^3} = 4600 \text{ mg/m}^3$$

$$\frac{4600 \text{ mg/m}^3}{500 \times 100} = 0.092 \text{ mg/m}^3$$

Conversion of mg/m³ to ug/m³

$$0.092 \text{ mg/m}^3 \times \frac{1000 \text{ ug}}{1 \text{ mg}} =$$

The ITSL for methyl dimethoxysilane = 92 ug/m³ based on annual averaging.

References:

1. Dow Corning. 1988. An acute whole body vapor inhalation toxicity study of methyl dimethoxysilane in the rat. Reference No. TX-88-9964-07; Series No. I-0005-2480.

mb:dp

cc: Cathy Simon, ESSD