

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Trimethylsilane file (CAS No. 993-07-7)

FROM: Gary Butterfield

DATE: August 4, 2005

SUBJECT: Screening level for trimethylsilane

Trimethylsilane is a colorless gas at ambient temperatures. It has a melting point of -135 degrees Celsius. The boiling point is 6.7°C. It has a molecular weight of 74.2 g/mol. The vapor pressure is reported to be 594 mmHg at 0°C.

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 2004), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on May 17, 2005. The literature searches did not find any published toxicity studies conducted with this material. The Air Quality Division (AQD) had a former ITSL, established in 1993, for trimethylsilane, which was set at the default value due to a lack of available toxicity data. In May 2005, to provide some toxicity data upon which an ITSL could be set, Dow Corning gave the AQD copies of results from two unpublished toxicity studies. The first was a Dow Corning rat acute inhalation study, and the second was a translation of a Japanese 28-day rat inhalation study.

In the acute inhalation study (Dow Corning 2001a), groups of 5 male and 5 female Fischer 344 rats were exposed whole-body to 1774 ppm or 5.4 mg/L for 4 hours. All of the rats survived the exposure period and the 14-day observation period. Based on this information, the LC50 for trimethylsilane was reported to be greater than 5.4 mg/L.

In the 28-day inhalation study (Dow Corning 2001b), groups of 6 male and 6 female Sprague Dawley rats were exposed whole-body to 0, 0.19, 0.87 or 4.73 mg/L for six

hours a day for 28 consecutive days. Fourteen-day recovery groups of 6 male and 6 female rats for the controls and high doses were also included in this study. There was no treatment related mortality, no changes in body weights, food consumption, organ weights, hematology, urinalysis, clinical chemistry, or histopathology. The no-observed-effect-level (NOEL) for this study is then identified as being 4.73 mg/L.

It is generally more desirable to use a longer term study for the basis for setting a screening level, because longer term exposures allow more potential toxic adverse effects to develop. Making use of the longer term study, the ITSL can be calculated using the 28-day NOEL and equation from Rule 232(1)(d) as follows.

$$\text{ITSL} = (4.73 \text{ mg/L}) / (35 \times 100) \times 1000 \text{ L/m}^3 \times 6/24 = 340 \text{ } \mu\text{g/m}^3 \text{ annual average}$$

References:

Dow Corning. 2001 a. An acute whole-body inhalation toxicity study of trimethylsilane in Fischer 344 rats. Dow Corning Corp report # 2001-10000-50632

Dow Corning. 2001b. A twenty-eight day repeated dose inhalation toxicity study of trimethylsilane in rats. Translation of a Japanese unidentified report. The translation is identified with Dow Corning report # 2001-10000-50740.

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