

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

June 11, 2009

TO: Propyltrimethoxysilane file (CAS # 1067-25-0)

FROM: Gary Butterfield

SUBJECT: Screening level for Propyltrimethoxysilane

Propyltrimethoxysilane is also known as trimethoxypropylsilane. The molecular formula is $C_6H_{16}O_3Si$ with a molecular weight of 164.2 g/mol.

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 - May 2009), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches for this evaluation were conducted on May 18, 2009. There were no toxicity studies located during the literature search for propyltrimethoxysilane.

Dow Corning provided an acute inhalation study conducted by IRDC (1978). There are a couple of concerns about this study. The original report only identified the test compound as TX-1499, making some question as to if propyltrimethoxysilane was actually being tested in this study. Dow Corning provided a cover sheet that identifies TX-1499 as being propyltrimethoxysilane. A second concern, the report identifies the molecular weight for TX-1499 as being 176 g/mol. The molecular weight for propyltrimethoxysilane is 164 g/mol. The difference in molecular weight is a problem when converting doses to ppm from mg/m^3 , which is not a severe problem using this study as the report identifies concentrations in mg/m^3 , besides the questionable ppm. In this study, the groups of 5 male and 5 female Charles River CD rats were exposed for 6 hours to what was reported to be 1018 or 4077 ppm (or 48.9 mg/L). The report does provide enough information to confirm the exposure nominal concentration in mg/m^3 (or mg/L) for the high dose group, not needing to utilize the questionable molecular weight

calculated ppm values. There were 3 deaths observed in the 10 rats exposed to the high dose during the 14-day observation period. So this high dose group must have experienced exposures close to a probable LC50. The lower dose group had no deaths observed; however, the report did not identify the exposure concentration for that group in mg/L values.

The high dose group was exposed to a concentration of 48.9 mg/L, which can be calculated as follows from 193.8 g being used over the 6-hour exposure period with 3960 L of air.

$$193.8\text{g}/3960\text{L} = 0.0489 \text{ g/L} = 48.9 \text{ mg/L} = 4.89\text{E}+4 \text{ mg/m}^3$$

The high dose from this study can be used as a surrogate LC50 for the purpose of determining the ITSL. The R232(1)(f) equation can be used to obtain an ITSL using the surrogate LC50 value, as follows.

$$(4.89\text{E}+4 \text{ mg/m}^3)/(500 \times 100) = 1 \text{ mg/m}^3 \text{ or } 1000 \text{ }\mu\text{g/m}^3 \text{ with annual average}$$

This screening level is considered to be health protective under the air toxic rules, as the true LC50 would be greater than 4.89E+4 mg/m³, and the exposures were for a 6-hour duration.

Reference:

IRDC. 1978. Acute inhalation toxicity study in rats. IRDC Report #416-023.

GB:lh