MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

August 19, 2014

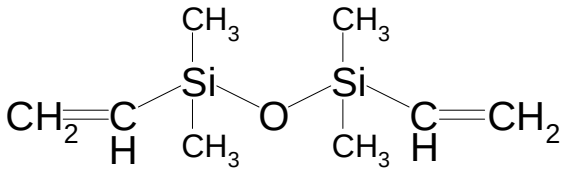
To: File for Divinyltetramethyldisiloxane (CAS No. 2627-95-4)

From: Michael Depa, Air Quality Division, Toxics Unit

Subject: Screening Level Update

The Initial Threshold Screening Level (ITSL) for divinyltetramethyldisiloxane is being updated to 38 µg/m³ with an annual averaging time.

Figure 1. Molecular Structure of Divinyltetramethyldisiloxane



A full literature was not performed as part of this review for divinyltetramethyldisiloxane. Gary Butterfield performed a full literature review in 1993, which resulted in a finding that the best available data for ITSL derivation was an LD50 study. The ITSL is being updated at this time because a higher quality toxicity study was made available for this compound during a toxicology review of another siloxane, namely divinylhexamethyltrisiloxane (136777-27-0).

Toxicity Data Provided By Dow Corning: 4-2776 Fluid
(>85% tetramethyldivinyldisiloxane)
The potential inhalation toxicity of the fluid was evaluated in four groups of 10 male and 10 female Sprague Dawley rats. The groups received filtered fresh air, or 5, 50, or 246 ppm fluid vapor for 6 hours/day, 5 days/week, for 2 weeks in chambers maintained between 25 and 29℃, and 35 to 45% relative humidit y. All animals were observed daily for treatment-related signs of toxicity, particularly for any evidence of respiratory, nasal, dermal, ocular, and behavioral changes; body weights were measured on Days 1, 8, and 15 of the study. Following the last exposure period, a gross pathological examination was conducted on all animals; various organs were also collected, preserved and examined histopathologically. No deaths occurred, nor were treatment related effects observed in any of the test animals. In addition, there was no apparent difference in the body weights or body weight gains of the test animals when compared with the air exposed controls. There was a significant slight increase of the spleen weight of the female rats in the 246 ppm dose group; this high dose group also had a statistically significant increase in liver weights. No other changes were noted in organ weights, no differences were noted upon gross examination of the organs, and there

were no differences in the histopathology of any organs, including the livers and spleens of the females of the highest dose group. It was concluded, therefore, that the inhalation of up to 246 ppm fluid vapor did not produce toxic effects (Dow Corning, 1993). Since there was a slight decrease in spleen weight and an increase in liver weight in the high dose female rats (246 ppm or 2622 mg/m³), the mid-dose of 50 ppm was identified as the no-observed-adverse-effect-level (NOAEL).

The mid-dose NOAEL of 50 ppm and Rule 232(1)(d) was the most appropriate basis to calculate an ITSL

Conversion of 50 ppm to mg/m³:

$$mg/m^3 = \frac{ppm \times MW}{24.45}$$

$$mg/m^3 = \frac{50\ ppm \times 260.6}{24.45}$$

$$mg/m^3 = 532.9$$

Using Rule 232(1)(d) for a 7-day inhalation study:

$$ITSL = \frac{NOAEL}{35 \times 100} \times \frac{hours\ exposed\ per\ day}{24\ hours\ per\ day}$$

$$ITSL = \frac{532.9\ (mg/m^3)}{35 \times 100} \times \frac{6}{24}$$

$$ITSL = 0.038\ mg/m^3 \times 1000\ \mu g/mg$$

$$ITSL = 38\ \mu g/m^3$$

It may be noted that the Rule 232(1)(d) equation includes in the denominator a factor of 35 for the extrapolation of a 7-day duration dose-response to an estimated chronic duration dose-response. The exposure duration in this key study (28 days) was substantially longer than 7 days, yet it was substantially less than a typical “subchronic” 90 day duration in rodents. There is a lack of guidance on any more appropriate extrapolation factor than 35 in such cases. Therefore, the factor of 35 is utilized here, with a note that this adds conservatism to the resulting ITSL.

The ITSL of 38 µg/m³ for tetramethyldivinyldisiloxane is given an averaging time of annual pursuant to Rule 232(2)(c).

Reference

Dow Corning. 1993. Internal Report – 1993-I000037739.
Obtained via personal communication via email Dated 8/14/14 @ 1:50pm. From Paul Schleusener to Michael Depa. Subject: Screening level request: Dow Corning Corporation, PTI application No. 622-92C. With attachment: 622-92C Applicant tox submital.pdf