

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

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**INTEROFFICE COMMUNICATION**

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TO: File for p-toluenesulfonic acid monohydrate (CAS# 6192-52-5)

FROM: Keisha Williams, Air Quality Division (AQD)

DATE: November 4, 2016

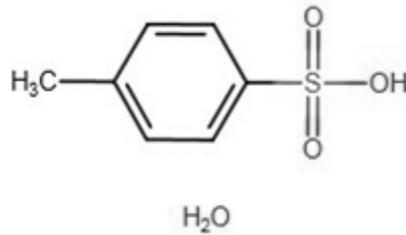
SUBJECT: Screening level update for p-toluenesulfonic acid monohydrate

The initial threshold screening levels (ITSLs) for p-toluenesulfonic acid monohydrate are 1.9  $\mu\text{g}/\text{m}^3$ , annual averaging time and 230  $\mu\text{g}/\text{m}^3$ , 1 hour averaging time.

The following references or databases were searched to identify data to determine the screening level: United States Environmental Protection Agency's (EPA's) Integrated Risk Information System (IRIS), the Registry of Toxic Effects of Chemical Substances (RTECS), the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV), National Institute of Occupational Safety and Health (NIOSH) Pocket Guide to Hazardous Chemicals, MDEQ Library, International Agency for Research on Cancer (IARC) Monographs, SciFinder, National Library of Medicine (NLM), Health Effects Assessment Summary Tables (HEAST), National Toxicology Program (NTP) Status Report, EPA Aggregated Computational Toxicology Resource (ACToR) Database, EPA TSCATS database, EPA Superfund Provisional Peer Reviewed Toxicity Values, EPA Acute Exposure Guideline Levels for Airborne Chemicals, EPA High Production Volume Database, United States Department of Labor Occupational Safety and Health Administration Permissible Exposure Limits, Spacecraft Maximum Allowable Concentrations, California Office of Environmental Health Hazard Assessments Reference Exposure Levels, Chemical Safety Program Protective Action Criteria, Texas Commission on Environmental Quality Effects Screening Levels, and European Chemicals Agency Registered Substances Dossiers.

There is a lack of information regarding the inhalation toxicity of p-toluenesulfonic acid monohydrate (Figure 1). However, High Production Volume (HPV) Assessment Reports on similar compounds, benzenesulphonic acid and the dehydrated form of p-toluenesulfonic acid monohydrate, noted that portal of entry (POE) effects are suspected as "both substances are sulphonic acids, which are very acidic (comparable to sulphuric acid) and therefore expected to show local effects in the gastrointestinal tract" (NOTOX, 2004; NOTOX, 2007). Since POE effects are expected, it is not appropriate to use toxicity information from oral studies to derive an ITSL. Although there is a lack of inhalation toxicity information, sulfuric acid toxicity data will be used to derive ITSLs in an effort to be health protective.

Figure 1. p-toluene sulfonic acid monohydrate



In the AQD Toxic Air Contaminant list, sulfuric acid has two ITSLs:  $1 \mu\text{g}/\text{m}^3$ , annual averaging time based on a monkey study where bronchial epithelial hyperplasia and bronchiolar wall thickening were seen in a dose-dependent fashion after 78 weeks of inhalation exposure and  $120 \mu\text{g}/\text{m}^3$ , 1 hour averaging time based on a human, clinical study where changes in airway function was seen in asthmatics in a dose-dependent fashion (MDEQ, 2015).

With molecular weight adjustment considerations, as shown in Equation 1, the resulting ITSLs for p-toluenesulfonic acid monohydrate are  $2 \mu\text{g}/\text{m}^3$ , annual averaging time and  $230 \mu\text{g}/\text{m}^3$ , 1 hour averaging time.

Equation 1.

$$\frac{ITSL_{\text{sulfuric acid}}}{\text{molecular weight}_{\text{sulfuric acid}}} = \frac{ITSL_{\text{p-toluenesulfonic acid monohydrate}}}{\text{molecular weight}_{\text{p-toluenesulfonic acid monohydrate}}}$$

where molecular weight for sulfuric acid is 98.1 g/mol

molecular weight for p-toluenesulfonic acid monohydrate is 190.2 g/mol

ITSLs for sulfuric acid are  $1 \mu\text{g}/\text{m}^3$ , annual averaging time and  $120 \mu\text{g}/\text{m}^3$ , 1 hour averaging time

$$ITSL_{\text{p-toluenesulfonic acid monohydrate}} = \frac{1 \frac{\mu\text{g}}{\text{m}^3}}{98.1 \frac{\text{g}}{\text{mol}}} \times 190.2 \frac{\text{g}}{\text{mol}} \approx 1.9 \frac{\mu\text{g}}{\text{m}^3}, \text{ annual averaging time}$$

$$ITSL_{\text{p-toluenesulfonic acid monohydrate}} = \frac{120 \frac{\mu\text{g}}{\text{m}^3}}{98.1 \frac{\text{g}}{\text{mol}}} \times 190.2 \frac{\text{g}}{\text{mol}} = 232.7 \frac{\mu\text{g}}{\text{m}^3} \\ \approx 230 \frac{\mu\text{g}}{\text{m}^3}, 1 \text{ hour averaging time}$$

## References

Act 451 of 1994, Natural Resources and Environmental Protection Act and Air Pollution Control Rules, Michigan Department of Environmental Quality.

MDEQ. 2015. *Memo from Michael Depa to Files for Sulfur Trioxide (SO<sub>3</sub>) [CAS# 7446-11-9], Sulfuric Acid (H<sub>2</sub>SO<sub>4</sub>) [CAS# 7664-93-9], and Oleum [CAS# 8014-95-7].* January 7, 2015.

Michigan Department of Environmental Quality, Air Quality Division.

NOTOX. 2004. High Production Volume (HPV) Challenge Program: HPV Assessment Report on Benzenesulphonic acid (CAS# 98-11-3).

NOTOX. 2007. High Production Volume (HPV) Challenge Program: HPV Assessment Report on p-Toluenesulphonic acid (CAS# 104-15-4). Accessed July 21, 2016.

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