

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Ethylene glycol monobutyl ether acetate (CAS# 112-07-2)

FROM: Doreen Lehner, Toxics Unit, Air Quality Division

DATE: February 3, 2017

SUBJECT: Ethylene glycol monobutyl ether acetate (CAS# 112-07-2) ITSL change in the averaging time from 24 hours to annual

The initial threshold screening level (ITSL) for ethylene glycol monobutyl ether acetate (EGBEA) is 2200 $\mu\text{g}/\text{m}^3$ based on an annual averaging time. The ITSL was originally established on 1/5/2000 and was based on an EPA reference concentration (RfC) of 13 mg/m^3 for ethylene glycol monobutyl ether (EGBE) which is a related compound. As the original justification for ethylene glycol monobutyl ether acetate was based off of EGBE. EPA updated their RfC for EGBE on 3/31/2010 to 1.6 mg/m^3 (1,600 $\mu\text{g}/\text{m}^3$). EPA derived the RfC from an NTP (2000) 2 year inhalation study on mice and rats with the critical effect of hemosiderin deposition in the liver. EPA used benchmark dose statistical software to find the point of departure and then used physiologically based pharmacokinetic modeling to calculate a human equivalent concentration of 16 mg/m^3 . An uncertainty factor of 10 was used to account for the variability of human response to the effects of EGBE.

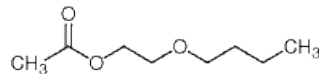


Figure 1. Ethylene glycol monobutyl ether acetate (molecular weight = 160.2 g/mol).

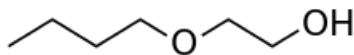


Figure 2. Ethylene glycol monobutyl ether (molecular weight = 118.18 g/mol).

$$ITSL \text{ for EGBEA} = ITSL \text{ for EGBE} \times \frac{\text{mol. wt of EGBEA}}{\text{mol. wt of EGBE}}$$
$$ITSL \text{ for EGBEA} = 1600 \mu\text{g}/\text{m}^3 \times \frac{160.2 \text{ g}/\text{mol}}{118.18 \text{ g}/\text{mol}} = 2168.894906 \mu\text{g}/\text{m}^3 \approx 2200 \mu\text{g}/\text{m}^3$$

The ITSL for EGBEA is 2,200 $\mu\text{g}/\text{m}^3$. As the key study used to derive the ITSL is a 2 year inhalation study, the averaging time is appropriately set at annual. Therefore, the averaging time is being changed from 24 hours to annual.

References:

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

EPA. 2010. Integrated Risk Information System. Ethylene glycol monobutyl ether (EGBE) (2-Butoxyethanol) (CASRN 111-76-2). Available online at: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=500

NTP. 2000. NTP technical report on the toxicology and carcinogenesis studies of 2-butoxyethanol (CAS No. 111-76-2) in F344/N rats and B6C3F₁ mice (inhalation studies). National Toxicology Program. Research Triangle Park, NC. NTP TR 484. Available online at: https://ntp.niehs.nih.gov/ntp/htdocs/lt_rpts/tr484.pdf

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

January 5, 2000

TO: Ethylene glycol monobutyl ether acetate file (CAS # 112-07-2)

FROM: Gary Butterfield, Toxics Unit, Air Quality Division

SUBJECT: ITSL for ethylene glycol monobutyl ether acetate

The U.S. Environmental Protection Agency (EPA) has recently posted a new Inhalation Reference Concentration (RfC) of 13 mg/m³ in the Integrated Risk Information System (IRIS) for 2-butoxyethanol, which is also known as ethylene glycol monobutyl ether. The chemical provides the basis for the ethylene glycol monobutyl ether acetate screening level, because the acetate would be removed from this compound as the first step of metabolism. The Initial Threshold Screening Level (ITSL) for the acetate is being set at 17600 µg/m³ with 24 hour averaging. This is to be consistent with this new 2-butoxyethanol RfC, which can be obtained by adjusting the RfC with the ratio of the molecular weights.

The new 2-butoxyethanol RfC is based on the changes in red blood cell count observed in F344 rats during the subchronic inhalation study reported by the National Toxicology Program (1998). Additional details on how the RfC was calculated by EPA are available in the December 30, 1999 IRIS write up, and the October 1999 Toxicological Review.

GB:SLB

cc: Cathy Simon, AQD
Mary Lee Hultin, AQD