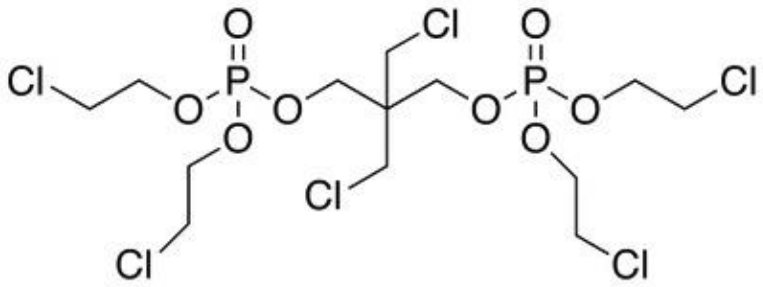

CAS 38051-10-4 - Bis(chloromethyl)propane-1,3-diyl tetrakis-(2-chloroethyl) bis(phosphate) (V6)

Toxicity

The State of California classified V6 as a carcinogen under Proposition 65.[1]

V6 is classified by the EPA as a moderate hazard for carcinogenicity and reproductive toxicity based on the toxicity of closely related structural analogs.[2] The European Union (EU) classified V6 as a 1b reproductive hazard.[3]

The EPA classified V6 as a high hazard for developmental toxicity based on an increased number of runts and reduced weights of offspring observed in a 2-generation study in rats.[1]

Exposure

V6 has been used as a flame retardant in polyurethane foam, including foam present in consumer and baby products, carpet pads and tent fabric. It is reportedly used in furniture and automobile foam.[4,5] A Boston study detected V6 at higher levels in car dust than in house dust.[4]

V6 was detected in finger nails sampled from a Norwegian cohort.[6] The half-life of V6 in orally exposed rats is 99-113 hours.[1]

V6 was detected in waste streams from wastewater treatment plants in Canada.[7]

Other

Tris(2-chloroethyl) phosphate (TCEP) is present as an impurity in commercial mixtures of V6.[1]

References

1. State of California OEHHA (2016). *Chemicals known to the state to cause cancer or reproductive toxicity*. 2016 August; Retrieved from http://oehha.ca.gov/proposition-65/proposition-65-list
2. U.S. Environmental Protection Agency (2015). *Flame retardants used in flexible polyurethane foam: An alternatives assessment update*. U.S. Environmental Protection Agency. Retrieved from https://www.epa.gov/sites/production/files/2015-08/documents/ffr_final.pdf

3. Environmental Chemicals Agency (ECHA) (2016). *Brief profiles: Tris(2-chloroethyl) phosphate*. [accessed September 2016]. Retrieved from https://echa.europa.eu/information-on-chemicals.
4. Fang, M., Webster, T.F., Gooden, D., Cooper, E.M., McClean, M.D., Carignan, C., Makey, C., Stapleton, H.M. (2013). Investigating a novel flame retardant known as V6: measurements in baby products, house dust, and car dust. *Environmental Science & Technology*, 47(9), 4449-54.
5. Stapleton, H.M., Klosterhaus, S., Keller, A., Ferguson, P.L., van Bergen, S., Cooper, E., Webster, T.F., Blum, A. (2011). Identification of flame retardants in polyurethane foam collected from baby products. *Environmental Science & Technology*, 45(12), 5323-31.
6. Alves, A., Giovanoulis, G., Nilsson, U., Erratico, C., Lucattini, L., Haug, L.S., Jacobs, G., de Wit, C.A., Leonards, P.E.G., Covaci, A., Magner, J. & Voorspoels, S. (2017). Case study on screening emerging pollutants in urine and nails. *Environmental Science & Technology*, 51, 4046-4053.
7. Woudneh, M.B., Benskin, J.P., Wang, G.H., Grace, R., Coreen Hamilton, M., Cosgrove, J.R. (2015). Quantitative determination of 13 organophosphorous flame retardants and plasticizers in a wastewater treatment system by high performance liquid chromatography tandem mass spectrometry. *Journal of Chromatography A*, 1400, 149–55.