

EXECUTIVE SUMMARY

Epoxy F – Oral Risk Assessment CAS # 19932-27-5			
PARAMETER	LEVEL	UNITS	DERIVED
NOAEL, LOAEL or BMDL₁₀ [No (or lowest) observed adverse effect level or 10% benchmark dose, lower 95% confidence interval]	Not identified		
TAC (total allowable concentration)	0.8	µg/L	For a 70 kg adult drinking 2 L/day
SPAC (single product allowable concentration)	0.08	µg/L	From the TAC, assuming 10 potential sources of Epoxy F in drinking water
STEL (short term exposure level)	0.8	µg/L	The STEL is set equal to the TAC due to the lack of empirical toxicity or aqueous stability data.
EXPOSURE SUMMARY	The very limited reported commercial applications of Epoxy F are anticipated to limit the potential for human exposure. Epoxy F is being investigated in a research and development setting as an ingredient in materials used in drinking water treatment products.		
KEY STUDY			
CRITICAL EFFECT	Due to the lack of empirical data for Epoxy F, a key study or critical effect was not identified.		
UNCERTAINTY FACTORS	No uncertainty factors were applied in this risk assessment, since an oral RfD was not determined.		
TOXICITY SUMMARY	No toxicity data were identified for Epoxy F, which has both polyfluorinated and epoxide/glycidyl ether epoxide structural alerts. The polyfluorinated moiety confers a high degree of metabolic stability, likely promoting biological uptake and retention, supported by an estimated octanol-water partition coefficient (K _{ow}) for Epoxy F of 2.21. Multiple structural alerts associated with the epoxide, glycidyl ether, and/or aliphatic halogen moieties include DNA binding, <i>in vitro</i> mutagenicity, <i>in vivo</i> micronucleus activity, genotoxic carcinogenicity, skin sensitization, and reproductive or developmental toxicity potential. Since a structural surrogate possessing both polyfluorinated and epoxide/glycidyl ether epoxide moieties was not identified, hazard assessment of Epoxy F relies on “read-across” approaches based on surrogate chemicals possessing either (but not both) of the moieties of concern. Cancer is the potential health hazard of greatest concern based on glycidyl ether analogs, and the available genotoxicity and chronic exposure data suggest genotoxic and nongenotoxic modes of action (MOA). Glycidyl ethers are genotoxic <i>in vitro</i> without (and sometimes with) metabolic activation. The <i>in vivo</i> genotoxicity data are limited and mixed. There is consistent evidence of a cytotoxicity- or repeated irritation-mediated MOA at the portal of entry and non-neoplastic or preneoplastic hyperplastic and degenerative lesions are seen at corresponding tumor sites. Limited evidence of remote effects or systemic toxicity is observed with glycidyl ethers. Being a short-chain (i.e., C ₄) and partially fluorinated chemical, the polyfluorinated moiety of Epoxy F has lower concern for toxicity relative to longer-chain (i.e., C _{≥6}), fully fluorinated compounds such as perfluorooctanoic acid. Drinking water action levels for Epoxy F derived herein are based on qualitative decision tree approaches that consider structural, metabolic (or lack thereof), and toxicity/potency of surrogates. A TAC of 0.8 µg/L for Epoxy F based on the Threshold of Toxicological Concern (TTC) concept provides a 2.5-fold margin over the lowest TAC derived for partial surrogates with oral risk assessments or chronic oral data.		
CONCLUSIONS	Potential health hazards of repeated, long-term oral exposure to Epoxy F may include bioaccumulation and portal of entry carcinogenicity. The drinking water action levels qualitatively derived herein are adequately protective of public health since they are based on conservative partial surrogates with empirical data.		