THE TOXICOLOGICAL EVALUATION OF A HALON REPLACEMENT

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This paper focuses on a thorough toxicological evaluation of HFC-227ea with emphasis on obtaining SNAP (Significant New Alternatives Policy) approval. The methods of inhalation toxicology will be presented. Developmental and subchronic toxicity studies as they relate to SNAP approved chemicals will be reviewed. There will be considerable detailed examination of cardiac sensitization. Methods for cardiac sensitization testing from various laboratories will be compared and guidelines for testing discussed.

In general, HFC-227ea was found to have a very low toxic potential. Rats exposed to concentrations as high as 80% for four hours experienced only a rapidly reversible anesthesia. Repeated daily exposures to concentrations as high as 10.5% (6 hrs/day) caused no evidence of toxicity under a standard EPA/TSCA protocol after thirteen weeks of exposure. Similarly, exposures to concentrations as high as 10.5% caused no evidence of maternal toxicity or adverse effects on fetal outcome in rats or rabbits. The lowest observed adverse effect level for cardiac sensitization was ≥ 10.5%. The margin of safety for cardiac sensitization of this halon replacement was comparable to Halon 1301 relative to fire fighting concentrations. Examination of these findings by the US EPA/SNAP lead to the conclusion that HFC-227ea is safe for use as intended.

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