

ETHYLENE GLYCOL

Information Update

ETHYLENE GLYCOLS Considerations Against Use in Theatrical Fogs/Mist and Artificial Smoke

Ethylene glycols¹ are sometimes used in the production of mists and fogs for theatrical productions and generation of artificial smoke for educational purposes or amusement. Such uses could result in excessive exposures to ethylene glycols through dermal and eye contact or inhalation. Consequently, the member companies of the American Chemistry Council's Ethylene Oxide/ Ethylene Glycols Panel (Panel) have independently developed policies regarding the risks associated with the use of ethylene glycols for making artificial smoke, mists and fogs.

Exposures by the population at large to ethylene glycols are generally quite limited. Ethylene glycols can be used appropriately in industrial, automotive and other appropriate applications, consistent with applicable regulatory provisions and with the applicable manufacturer's product safety information. The greatest risks of adverse health effects from ethylene glycols typically result from eating or drinking them, which should never be attempted. It is also possible to be exposed through contact with the skin or by inhaling ethylene glycol vapors. These exposures can be eliminated or minimized by taking recommended preventive measures when using ethylene

glycols products; information about these measures is available from the product manufacturers and other sources. Preventive measures to reduce inhalation exposures in industrial, automotive and other appropriate applications may not be consistent with preventive measures for the generation of theatrical fogs, mists or artificial smoke, or with the entertainment settings in which these special effects are generated. As a result, use of ethylene glycols in theatrical fogs, mists or artificial smoke is impractical.

Although no permanent or significant injury normally would be expected to result from inhalation exposure, some individuals could experience local respiratory tract irritation. A 1997-99 study by investigators from the Mount Sinai School of Medicine and ENVIRON, undertaken at the request of the Actors' Equity Association (AEA) and the League of American Theaters and Producers (LATP), found that upper respiratory symptoms were associated with exposure to theatrical fogs; no evidence of serious or permanent health effects was found to be a result of glycol exposure, however. (It should be noted that this study assessed exposures to glycols *other than* ethylene glycol, which the investigators stated was not being used to produce theatrical smoke and haze.) See Moline, *et al.*, *Health Effects Evaluation of Theatrical Smoke, Haze and Pyrotechnics* (June 6, 2000). The study was intended to expand upon earlier studies by

¹ Ethylene glycol and higher glycols, including diethylene glycol (DEG), triethylene glycol (TEG), pentaethylene glycol (PEG), and tetraethylene glycol (TTEG).

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the National Institute for Occupational Safety and Health (NIOSH) that had concluded, without indicating that ethylene glycol was implicated in this result, that theatrical fogs may contribute to upper respiratory tract problems, including sneezing, nasal congestion, coughs, breathlessness, and sore or dry throat conditions.

Both the Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have addressed workplace exposure levels for ethylene glycol. OSHA's maximum permissible exposure level (PEL) for ethylene glycol in the workplace was set at 50 ppm (127 mg/m³) in 1989; while this was one of numerous OSHA standards vacated in a 1992 federal court decision and not yet readopted, the PEL serves to indicate OSHA's position. The maximum threshold limit value (TLV) for ethylene glycol (aerosol) recommended by ACGIH in 1998 was 40 ppm (100 mg/m³).

In summary, while it is not expected, based on the relevant literature, to anticipate that serious or permanent injuries would result from inhalation exposure to ethylene glycols used in theatrical fog/mist or artificial smoke machines, each Panel member company independently has developed its own policies to address the potential risks associated with the use of ethylene glycols in theatrical fogs, mists or artificial smoke. Ethylene glycols manufacturers should be consulted before considering such an application.

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This update has been prepared by the American Chemistry Council's Ethylene Oxide/Ethylene Glycols Panel. The Panel's purposes include advocacy, research, education, communication, and evaluation needed to promote safe practices among producers and users of ethylene glycols. For more information, contact the Panel Manager, Mr. William P. Gulledge, at 703-741-5613, or e-mail at william_gulledge@americanchemistry.com
December 2003

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