

# Entertainment Services and Technology Association



## American National Standard E1.5 - 2003 Entertainment Technology Theatrical Fog Made With Aqueous Solutions of Di- And Trihydric Alcohols F&S/1997-3017r7.5

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## **The ESTA Technical Standards Program**

**The ESTA Technical Standards Program** was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry including USITT, PLASA, and VPLT as well as representing the interests of ESTA members to ANSI, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute as Accredited Standards Committee E1, Safety and Compatibility of Entertainment Technical Equipment and Practices.

**The Technical Standards Committee (TSC)** was established by ESTA's Board of Directors to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Committee approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Committee employs a Technical Standards Manager to coordinate the work of the Committee and its working groups as well as maintain a "Standards Watch" on behalf of members. Working groups include: Camera Cranes, Control Protocols, Electrical Power, Floors, Fog and Smoke, Photometrics, and Rigging.

**ESTA** encourages active participation in the Technical Standards Program. There are several ways to become involved. If you would like to become a member of an existing working group, as have over two hundred people, you must complete an application which is available from the ESTA office. Your application is subject to approval by the working group and you will be required to actively participate in the work of the group. This includes responding to letter ballots and attending meetings. Membership in ESTA is not a requirement. You can also become involved by requesting that the TSC develop a standard or a recommended practice in an area of concern to you.

**The Fog & Smoke Working Group**, which authored this standard, consists of a cross section of entertainment industry professionals representing manufacturers, consultants, dealers, and end-users. ESTA is committed to developing consensus-based standards and recommended practices in an open setting. Future Fog & Smoke Working Group projects will include updating this publication as changes in technology and experience warrant, as well as developing new standards and recommended practices for the benefit of the entertainment industry.

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## 1 Scope

This standard describes the composition of theatrical fogs or artificial mists that are not likely to be harmful to otherwise healthy performers, technicians, or audience members of normal working age, which is 18 to 64 years of age, inclusive. This standard makes no statement about appropriate exposure limits for theatrical fogs or artificial mists with other populations, and no limits, higher, lower, or the same as these limits, for other populations should be inferred from it. This standard is limited to those fogs and mists made from a solution of water and one or more dihydric or trihydric alcohols. These fogs are commonly called "glycol fogs," although only those that use dihydric alcohols are technically made with glycol.

This standard is intended to be applied in theatres, arenas, and other places of entertainment or public assembly where theatrical fogs and mists are often used as visual effects or to enhance lighting effects in live performances such as dramatic productions, musicals, and popular music concerts. It may be used as a guidance document in other venues where the exposed population is similar to that defined in this scope and where the respiratory and vocal demands on the population are not greater than those placed on performers, technicians, or audience members participating in dramatic productions, musicals, or popular music concerts.

## 2 Definitions

**2.1 aerosol:** a suspension of small particles in a gas or air.

**2.2 fog:** a liquid aerosol in air that reduces visibility and reflects light.

**2.3 dihydric alcohol:** an alcohol that has two hydroxyl groups.

**2.4 glycerin:** a trihydric alcohol composed of a chain of three carbon atoms linked by single covalent bonds, with each carbon atom linked to one hydroxyl group and one or more hydrogen atoms. Also called "glycerol."

**2.5 glycol:** a dihydric alcohol, an organic compound with a molecular structure having two hydroxyl groups.

**2.6 hydroxyl group:** a molecular group containing one hydrogen and one oxygen atom.

**2.7 mist:** a liquid aerosol, not as optically dense as fog, but with larger droplets.

**2.8 STEL:** Short Term Exposure Limit. The maximum exposure level averaged over a short term, generally 15 minutes.

**2.9 trihydric alcohol:** an alcohol that has three hydroxyl groups.

**2.10 TWA:** Time Weighted Average. Exposure level averaged over an 8-hour period.

## 3 Requirements

### 3.1 Components

The following dihydric and trihydric alcohols are components that may be used with water in a fog or mist that meets this standard: