

# Entertainment Services and Technology Association



## American National Standard E1.23-2010 Entertainment Technology - Design and Execution of Theatrical Fog Effects

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**The Entertainment Services and Technology Association**



**ANSI E1.23-2010**  
**Entertainment Technology - Design and**  
**Execution of Theatrical Fog Effects**

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This edition of ANSI E1.23 was approved as an American National Standard by the ANSI Board of Standards Review on 20 September 2010. It was approved by the ESTA Board on 24 July 2010. It is a revision of ANSI E1.23 - 2006.

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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.

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, Followspot Position, 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 a diversity of interests. 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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The Fog & Smoke Working Group was the consensus body for the development of this standard. The working group's membership when the letter ballot closed on 19 April 2010 is shown below.

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### Interest categories

CP	Custom-market Producer	U	User
MP	Mass-market Producer	G	General Interest
DR	Dealer or Rental company	DE	Designer



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## 1 General

### 1.1 Scope

This Standard is intended to be applicable to the creation of theatrical effects using artificial fogs or mists in theatres, arenas, and other places of entertainment or public assembly.

The fogs and mists covered by this Standard are aerosols created using one or more of the following liquids:

Name	Chemical Abstracts Service (CAS) #
triethylene glycol	112-27-6
monopropylene glycol (propylene glycol; 1,2-propanediol)	57-55-6
diethylene glycol	111-46-6
dipropylene glycol	25265-71-8, 106-62-7, 110-98-5, 108-61-2
1,2-butylene glycol (1,2-butanediol)	584-03-2
1,3-butylene glycol (1,3-butanediol)	107-88-0
glycerin (glycerol; 1,2,3- propanetriol)	56-81-5
white mineral oil, medicinal or food grade	8042-47-5
water	07732-18-5
nitrogen, liquefied (LN2, L-N2))	7727-37-9
oxygen, liquefied (LOX)	80937-33-3
carbon dioxide, liquefied (LCO2, L-CO2)	124-38-9

The aerosols within the scope of this Standard are injected directly into the environment or are carried out of the fog generating equipment on a stream of ambient air, or a stream of nitrogen, argon, carbon dioxide, or a mixture of nitrogen and oxygen that approximates the composition of normal air. The Chemical Abstracts Service registry numbers for the gases that may be used as vehicles for the aerosols within the scope of this Standard are as follows:

Name	CAS #
oxygen	7782-44-7
nitrogen	7727-37-9
argon	7440-37-1
carbon dioxide	124-38-9

This Standard is not intended to be used for guidance in planning or executing any fog effect that uses a liquid or gas not listed above.

### 1.2 Purpose

The purpose of this Standard is to offer atmospheric effects creators and operators guidance in the planning and execution of theatrical fog effects so that the health and comfort of workers and spectators shall not be compromised by excessive exposure to chemicals and particulates that are the result of the use of such theatrical fog effects. The Standard is also intended to provide guidance related to the obscuration of hazards or paths of egress in the theatre, arena, place of entertainment or public assembly in which the fog effect is produced. In addition, the Standard is intended to help avoid accidental triggering of fire detection and notification systems, while preserving the required functioning of the systems.

To help in offering guidance, Annex A contains explanatory text for some of the clauses in this Standard. Clauses for which explanatory text is available are marked with an asterisk. The relevant clause in Annex A has the same clause number as the text to which it refers, but the clause number is preceded by the letter A to show that it is part of the annex.