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Guidelines for Use of Theatrical Fog

Overview

Sometimes K–12 school theatrical productions choose to enhance visual effects by using theatrical fog. While this can be a fun addition, theatrical fog comes with potential health risks to student performers and staff.

This guide provides:

- Awareness of the health risks attributed to the chemicals commonly found in fogging products and the aerosols they create.
- Parameters for use that may lessen these risks.

In general, using optional chemicals such as those in theatrical fog is discouraged. Use must be discontinued immediately if any students or staff experience discomfort.

Health Concerns

Studies show increased acute symptoms, including nasal, respiratory, and mucous membrane irritation, following repeated exposure to theatrical fog. Little is known about the chronic health hazards that many chemicals in fogging products cause¹.

Follow these guidelines when using theatrical fog:

Product Selection

- Always get a Safety Data Sheet (SDS) for the fogging product. If specific ingredients aren't listed, don't use the product. You also can contact the manufacturer to verify what's in the product. This will ensure you avoid chemicals not recommended for use.
- If the product formulation changes, get an updated SDS and reevaluate the safety of the product.
- Avoid using fogging products that contain diethylene glycol, ethylene glycol, 1,4 butylene glycol, polyethylene glycol, or mineral oil. These products have low exposure limits, a lack of available toxicity information, or concerning toxicity studies¹.
- See the references^{1,2,4,5} listed on Page 2 for information on the toxicity and safe use practices of other fogging chemicals. In general, chemicals that require a shorter time to achieve a safe exposure level in the *Theatrical Smoke, and Haze Regulations*², those associated with a lower incidence of adverse health outcomes⁵, or those that produce lower concentrations of particles⁴ are considered safer.
- Only fluids and gases the equipment manufacturer specifies are approved for use in the fogging equipment.
- Use water mists or steam where the desired effect can be short-lived.

Safe Use Practices

- Fog-making devices must be placed where the operator can easily access them without blocking emergency access or creating an opportunity for unintended contact.
- Only adults should handle fogging chemicals. Many have labels warning to keep them out of the reach of children.
- Do not aim the fogger in the direction of the audience or nearby people.
- Fog distribution should be planned to create minimal exposure to performers, staff, and the audience. Guidelines for safe distances and timing for use are in the *Theatrical Smoke and Haze Regulations* listed in References, below. The parameters in this document relate to specific fogging products and ventilation conditions present during the testing period. However, they may still be used as general guidelines in the absence of air sampling if the fogging product is used in an open space such as a stage in an auditorium.
- Have designated, specifically trained individuals operating the fogging machine³.
- Fogging aerosols should be used only where and when needed. Limit or avoid use during rehearsals.
- The fogging process must be tested before use around performers and other staff to ensure that critical visibility is not lost, and that the aerosol does not drift into unintended areas³.
- Maintain and use fogging equipment and supplies according to the manufacturer's instructions.
- Post notices at the box office or other places tickets are sold to advise customers that theatrical fog will be used during the production.

References

¹Colden-Phylmar, 2017. [Theatrical Fog Exposure Assessment Methods, Exposure Limits, and Health Effects—Literature Review](#).

²[Theatrical Smoke and Haze Regulations](#), Actors' Equity Association.

³ANSI E1.23 – 2020. [Entertainment Technology—Design, Execution, and Maintenance of Atmospheric Effects](#).

⁴Kay Teschke, Yat Chow, Chris Netten van, Sunil Varughese, Susan M. Kennedy & Michael Brauer (2005) Exposures to Atmospheric Effects in the Entertainment Industry, *Journal of Occupational and Environmental Hygiene*, 2:5, 277-284, DOI:10.1080/15459620590952215

⁵Varughese, Sunil, et.al. Effects of Theatrical Smokes and Fogs on Respiratory Health in the Entertainment Industry *Am. J. Ind. Med.* 47:411–418, 2005. © 2005 Wiley-Liss, Inc.

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