

Artificially Created Smokes and Fogs

ACTSAFE SAFETY BULLETIN #2

This bulletin provides guidelines for creating and using smokes and fogs safely.

SUBSTANCES THAT SHOULD NOT BE USED

- Known human carcinogens, including any particulates of combustion (e.g., tobacco smoke).
- Fumed and hydrolyzed chlorides.
- Ethylene glycol and diethylene glycol.
- Mineral oils.
- Aliphatic and aromatic hydrocarbons, including petroleum distillates.
- Hexachloroethane and cyclohexylamine.

SUBSTANCES THAT MAY BE USED

Consult safety data sheets (SDSs) before acquiring and using the following products:

- Propylene glycol, butylene glycol, polyethylene glycol, and triethylene glycol. Other glycol products should not be used (e.g., ethylene glycol and diethylene glycol).
- Glycerin products.
Note: Glycerin and the allowable glycol products listed above should not be heated beyond the minimum temperature necessary to aerosolize the fluid. Glycerin and glycol should never be heated above their decomposition temperature of 290°C (554°F).
- Cryogenic gases (e.g., carbon dioxide and liquid nitrogen) may be used, but care must be taken to avoid depleting oxygen levels, especially in enclosed areas. Take care to avoid adverse effects of cooled air on exposed workers.

CREATING AND USING EFFECTS

When smoke or fog effects are scheduled to be created, all workers should be notified ahead of time about the types and use of effects. Signs should be posted warning the public that fog will be used as part of the performance.

Producers should use the minimum concentration necessary to achieve the desired effect. When using smoke or fog effects, keep all non-essential workers away from the set. Whenever possible, vacate workers from all dressing rooms located on the stage.

Ventilate or exhaust the stage periodically, vertically and laterally. Otherwise, workers and animals should have a break away from the stage at appropriate intervals.

Producers may need to create an exposure control plan (ECP) to help protect against exposures to hazardous substances being used. For more

information on ECPs, see [section 5.54](#) of the Occupational Health and Safety Regulation.

Exposure limits

Special effects technicians should monitor smoke and fog concentrations to ensure exposure limits are not exceeded. Keep in mind exposure limits for extended work periods when shifts exceed 8 hours. Time-weighted average limits for shifts longer than 8 hours are specified in [section 5.50](#) of the OHS Regulation.

Respirators

Producers should make appropriate respirators available on request. There should be a designated person responsible for providing respirators. To determine the appropriate type of respirator, consult the SDS for the product.



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MONITORING

- Assess the risks of overexposure in the workspace before using the smoke effect.
 - Know the exposure limits of the product as specified in the SDS.
 - Follow the standard method to monitor smokes and fogs.
 - Use the continuous monitoring method, which is automated to provide real-time data.
- If exposure limits are met or exceeded, ventilate the space and give workers a break

RELATED RESOURCES

- [E-Limit search tool for exposure limits](#) (WorkSafeBC)
- [Evaluation of Short-Term Exposure to Theatrical Smoke and Haze: Air Sampling Protocol](#) (ENVIRON International Corporation)

REGULATORY REFERENCES

- OHS Regulation: [5.48–5.59, Controlling exposure](#)
- OHS Guidelines: [Table of exposure limits](#)
- WorkSafeBC Policies: [R5.48-1, Controlling exposure — Exposure limits](#)

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