

Using Foam in Set and Prop Construction

Acts safe Safety Bulletin #10

This bulletin provides guidance on the safe handling, use, storage, and disposal of foam used to construct stage sets and props. Foam products are made of petroleum distillates. They can ignite when exposed to heat sources or release vapours during application or use.

Only approved fire-resistant foams should be used. When sourcing products, ask for guidance from the supplier, the local fire authority, or the technical director.

TYPES OF FOAM

The following types of foam are most commonly used in set and prop construction:

- Sprayable polyurethane foam
- Two-part polyurethane foam (AB foam)
- HSF 110 pour foam, Class 1 (polyurethane/AB foam)

- Expanded polystyrene (EPS) or polyurethane
- Polystyrene foam blocks

Use caution at all times when working with or near foam. The foams listed above are available as fire-resistant and non-fire-resistant products. Under the right conditions, however, even fire-resistant foams will burn.

HAZARDS

Hazards include foam combustion and exposure to vapours and gases released from the foam.

Polyurethane-based foams

Polyurethane-based foams contain isocyanates that are released during mixing, spraying, and curing. Isocyanates can cause serious and sometimes fatal respiratory issues. Workers can become so sensitized to isocyanates that they can no longer work around them.

Polyurethane foams release toxic fumes and gases when subjected to high heat, such as when using a hot wire cutter.

When working with polystyrene foam, however, the smoke or fumes created are mostly carbon dioxide and water vapour, which is not as hazardous. Nevertheless, additional fumes can be released, so precautions must still be taken to minimize exposure.

Foam combustion

When foam products burn, depending on the product, they can generate dense clouds of black smoke and a variety of toxic gases, including

styrene, toluene, benzene, carbon dioxide, carbon monoxide, oxides of nitrogen, and traces of hydrogen cyanide. All precautions must be taken to avoid ignition of foam. If you are exposed to burning foam, report to first aid immediately.

Sanding or grinding polyurethane or polystyrene foam can produce combustible dust, which is a fire and explosion hazard.

Exposure to foam vapours and gases

Using a hot wire will not generate the levels of toxic gases or vapours that occur with combustion, but it can create vapours that result in exposure through inhalation, skin contact, or eye contact.

Inhalation

Airborne vapours, aerosol mists, and particulates can irritate the respiratory tract. Symptoms of overexposure may include:

- Tightness of the chest
- Difficult or laboured breathing
- Headache
- Nausea or vomiting



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Exposure to higher concentrations may result in chemical bronchitis, pneumonitis, and pulmonary edema. Some individuals may become sensitized and experience severe asthma-like attacks whenever they are exposed to even minute amounts of vapour.

Skin contact

A single prolonged exposure is not likely to result in the foam material being absorbed through the skin in acutely toxic amounts, but skin contact

can discolour the skin and cause irritation. Such exposures may result in contact dermatitis and skin sensitization.

Eye contact

Direct or indirect contact with foam material can cause eye irritation, temporary blurred vision, and corneal damage. Ordinary safety glasses or face shields will not prevent eye irritation when there are high concentrations of vapour. Use goggles that provide a tight seal and are indirectly vented or non-vented.

CONTROL MEASURES

Foam must meet all applicable federal, provincial, and local requirements. Contact your local fire department.

Ask your supplier to include manufacturers' technical data sheets, if available, and safety data sheets (SDSs) with each order. These documents must be available at the workplace.

Foam is combustible. Do not set up welding or cutting operations near foam operations. Take special precautions when using pyrotechnics or other types of special effects near foam. Avoid contact with sources of ignition before, during, and after installing foam. Smoking is prohibited while working with or around foam.

Make sure fire suppression devices and materials are readily available (e.g., type A, B, or C fire extinguisher).

Give foam products and associated adhesives time to dry and cure before sculpting or shaping. A non-cured joint is a fire hazard.

Avoid using hot wire cutters with polyurethane foams, which can release toxic fumes and gases when subjected to high heat or ignition. Use mechanical means or hand tools whenever possible.

If the use of a hot wire cutter is required, substitute polyurethane foams with polystyrene foams.

Do not expose foam to reactive chemicals such as solvents or petroleum products. For more information, see the product SDS and manufacturer's technical data sheet.

Each work area should have adequate ventilation to draw vapours, aerosol mists, or smoke away from the worker's breathing zone. Otherwise, respiratory protection must be used.

Personal protective equipment (PPE) may include eye, skin, and respiratory protection (a half facepiece respirator with a P100 organic vapour cartridge).

Working with polyurethane or polystyrene foam produces combustible dust. Clean the work area regularly throughout the shift to ensure dust does not build up and pose an explosion or fire hazard.

Safe egress

- During set design and pre-production, consider exits for performers and crew in case of fire or other emergencies.
- During construction, the technical director should identify exits and maintain clear and unobstructed escape routes.
- When performing, the technical director is responsible for ensuring that performers and crew are made aware of the escape routes.

Applying two-part polyurethane/AB foam

- Only qualified workers should spray AB foam.
- Schedule the application of large quantities of AB foam when other performers and crew are not on the stage or floor. Have a qualified



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person determine when it's safe to re-enter the space.

- When using AB foam (hand mixed or with froth packs), refer to the SDS.
- Applying AB foam generates heat and may increase the risk of fire.
- Minimize spaces between foam blocks that will be filled with AB foam. Large spaces that have been filled with AB foam could potentially ignite.
- When spraying foam, keep equipment clean, calibrated, and in good working order. Pay special attention to nozzles, pickups, and tubing.
- Ground and bond drums and other containers for AB foam components to prevent static electricity from building up.
- Avoid spills when storing and using AB foam to prevent exposures.
- When storing large amounts (e.g., 55-gallon drums) of AB foam, use appropriate secondary containment and consult the technical director, local fire authority, or local authority having jurisdiction.
- Use care when disposing of uncured AB foam. It can generate heat and cause fires.

Hot work on foam

- Only qualified workers should use hot-wire devices.
- Ask your local fire department whether you need a permit for hot work.
- Hot work must not be performed within 3 m (10 ft.) of any other flammable or combustible materials.
- All equipment used in a hot-wire operation must be inspected and kept in good working order at all times.
- Handheld hot-wire devices should be able to be disconnected from the electrical supply at the device.
- The hot wire should be adjusted so the wire is not visibly red.
- Do not leave hot-wire heated elements connected and unattended.
- During hot work, there should be a fire watch that continues for at least 30 minutes after the interruption or conclusion of hot-work operations.
- Workers assigned to fire-watch duty must have fire-extinguishing equipment readily available and must be trained in its use.

REGULATORY REFERENCES AND RELATED RESOURCES

- OHS Regulation, [Part 8: Personal Protective Clothing and Equipment](#)
- [National Fire Protection Association \(NFPA\) 140](#), Standard on Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations
- WorkSafeBC [Exposure Registry Program](#) (Form 41M1)

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