



# NORTHSTAR FIRE DEPARTMENT



## OPEN FLAME ACTS – GUIDELINES & SPECIFICATIONS

### Fire Prevention Guideline P-08

#### PURPOSE

The following are Northstar Fire Department's (NFD) minimum submittal requirements for flaming bowl dances, flaming sword dances, flaming batons, and all other open flame acts in places of assemblage, institutions or other occupancies where the public is invited or admitted.

#### SCOPE

This guideline applies to temporary installations and activities of Group I, III, VI, and VII flame effects, used in outdoor or indoor venues with attended operation and manual or automatic fuel control. This guideline also applies to attended, manually-operated portable flame effects produced by devices or appliances such as propane accumulators. It encompasses, but is not limited to, flame effects produced by hand-held burning torches, cigarette lighters, candles, matches, jugglers burning batons, fire rings that are jumped through, and other fire effects that have the illusion of danger to a performer. It also pertains to traveling entertainment events and includes various venues like operas, musicals, stage plays, trade shows, corporate events, and visual art displays.

The requirements of this guideline are referenced from the National Fire Protection Association Standard for the Use of Flame Effects before an Audience (NFPA 160). Flame effect plans and flame effect activities shall also comply with any and all applicable standard requirements of NFPA 53, and NFPA 58. For all referenced documents in this bulletin, the most current edition shall be used unless an older edition is currently adopted by the State of California.

Please also review the NAFAA Performer Safety Guidelines attached at the end of this guideline.

#### SUBMITTAL REQUIREMENTS

1. **DEFINITION** (See NFPA 160, Chapter 3 for additional definitions).

**Safe Clearance Distance:** The minimum approved distance required from the heat of the flame effect that ensures spectators, performers, support personnel, and the operator are not exposed to a hazardous situation; also, the minimum approved distance required from the heat of the flame effect to combustible materials that ensures the ambient temperature of combustibles will not exceed 117 degrees Fahrenheit (47.2 0 C) after equilibrium temperatures are attained.

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2. **REQUIRED SUBMITTAL DOCUMENTS.** All required documents for flame effect performances shall be submitted a minimum of ten (10) business days prior to the use of the flame effect to allow for a timely review and consideration of alternate proposals should the original proposal be disapproved.

NFD may require a standby fire safety watch for the use of the flame effect. If a fire watch is required, the proper application form with appropriate fee shall be submitted at least five (5) business days before the proposed date of use of the flame effect.

Some or all of the documents (or portions thereof) listed below will be required for the use of flame effects on a case-by-case basis, depending on the nature of the effect.

- 2.1 **NFD Fire Permit Application.** A NFD “Temporary Open Flame Permit” is required for the use of temporary flame effects.
- Performer, company, or agent must obtain the Temporary Open Flame Permit prior to any flame effect performance.
  - The use permit is only valid for the venue site and time(s) indicated on the approved permit. The submission of a permit application.
  - The acceptance of an application by NFD is only a request to perform the flame effect and shall not be considered as an approval or permission to conduct the requested activity.
- 2.2 **Certificate of Liability Insurance.** A signed certificate documenting proof of current liability insurance for the responsible person, group, or organization in the amount of at least one million (1,000,000) dollars (or more if specified by NFD) shall be provided in the submittal package. The certificate shall list the District and Placer County and its employees as “Additional Insured”.
- 2.3 **Application for Special Events.** A completed “Special Event Application” shall be included in the submittal package. This application requires the submitter to provide both general and specific information related to the event and assists the Fire Department in determining if any other activities warrant further clarification or additional operational permits.
- The applicant shall indicate all activities occurring on the event grounds and shall provide an available on-site contact person with a contact number. An estimate of the number of persons in the audience shall be provided.
  - A pre-event inspection by a NFD representative with the on-site contact person is required at least one (1) hour prior (or as required by NFD) to the flame effect performance to confirm compliance with permit conditions and fire regulations before the permit will be approved.

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- 2.4 Flame Effect Plan. Within the Special Events application, the applicant will need to complete the portion of the application known as the Flame Effect Plan. The Flame Effect Plan provides specific site and safety information to assist NFD with evaluation of the flame effect and its compliance with fire safety standards and practices. The Flame Effect Plan shall include all of the following information:
- Name of responsible person, group, or organization;
  - Name of flame effect operator;
  - Date(s) and time(s) of the flame effect;
  - Building address or event location;
  - Building life safety systems and building fire protection systems as applicable;
  - Identification of each flame effect to be utilized;
  - The proposed Safe Clearance Distance from the flame effect to non-performers with the justification (basis) for that distance;
    - An audience should not be located so that the incident thermal radiation causes the surface temperature of the audience member's exposed skin to exceed 111 degrees Fahrenheit (440 C).
    - Temperatures of combustible materials subject to the heat of the flame effect shall not exceed 117 degrees Fahrenheit (47.20 C) above the ambient temperature after equilibrium temperatures is attained.
    - Documentation of the testing and evaluation of the flame effect in relation to the safe clearance distance to both the exposed skin temperature and to combustible materials shall be prepared by a third party acceptable to the SFFD.
    - Flame effects shall be evaluated to verify that spectators, performers, support personnel, and the operator are not exposed to a hazardous situation. Other factors shall be considered in evaluating the proposed safe clearance distance, including the experience and qualifications of the operations and maintenance personnel, visual conditions, magnitude of the potential hazard, and whether the flame effect is static (stationary) or dynamic (mobile) during the performance.
    - Confirmation by NFD of the applicant's justification or basis for the safe clearance distance(s) and the proposed fire safety perimeter line may require the services of a Fire Protection Engineer. In such cases, an additional hourly fee will be charged to the applicant to cover any plan check services provided by an Engineer (or, 3rd party consultant).
    - NOTE: Justification for the determination of the proposed safe clearance distance from the flame effect to the audience and combustibles denoted by the fire safety perimeter line is required and shall be included with the application document package.
  - Provisions to prevent intrusion by non-performers from the safe clearance distance into the hazard area;

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- Flame effect safety provisions for ventilation systems (if indoors) or weather conditions (if outdoors) as applicable;
  - Documentation providing proof that combustible materials and clothing are flame-proof or have been treated with flame retardant when required;
- 2.5 Site Plan. An 11-inch x 17-inch Site Plan (scaled to not less than 1/4 inch per foot) with a legend shall also be included with the Special Event application. The Site Plan shall include a dimensional plot map of the site reflecting the following:
- Location of flame effect device(s), controls, and flame effect operator;
  - Area affected by the flame effect including all six (6) site zones, i.e. below (floor), above (ceiling), front, back, left, and right sides;
  - Fire safety perimeter line delineating the hazard area both from the audience and from combustibles;
  - Location of the audience;
  - Clearance to combustibles;
  - Storage and holding area of fuels;
  - Fuel application and use areas;
  - Means of egress from both the flame effect area(s) and audience area(s) to the public way;
  - Location of appropriate supplemental fire protection features including trained fire safety staff, fire extinguishers, “No Smoking” signs, barricades, etc.;
- 2.6 Design Plan. A design plan is also required prior to NFD approval of the production of flame effects using devices or appliances. The design plan shall provide the system design criteria with complete design information (including schematic drawings) and sequence of operation & shall include the following as applicable:
- Flame effect equipment and components with proof of UL listings or proof of compliance with appropriate standards;
  - Flame effect control system including emergency stop, fuel management, effect valve, and the enabling, arming and firing of the effect;
  - Flame effect control sequence;
  - Manual fuel shutoff valve and power control;
  - Automatic fuel shutoff valve;
  - Method of confirmation of means of ignition;
  - Method and frequency of leak detection;
  - Type(s) of fuel used;
  - Minimum amount of fuel required to produce the flame effect and minimum size of fuel tank required for the duration of the performance with supporting calculations;
  - Provisions for the removal of unconsumed fuel from the device or appliance in a safe location;

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3. **REVIEW PROCESS.** NFD will only accept and review a complete application package with supporting documents. NFD's determination of your proposal will be forwarded to you in a timely manner for your review. Please note the following:
  - 3.1 ALL FLAME EFFECTS SHALL BE DEMONSTRATED TO THE FIRE DEPARTMENT AND EVALUATED FOR COMPLIANCE WITH FIRE SAFETY REQUIREMENTS PRIOR TO APPROVAL OF THE FLAME EFFECT PLAN.  
Recorded visual media of each flame effect as proposed may be accepted in lieu of a live demonstration if agreed to in advance by the fire department.
  - 3.2 A site visit may be required to determine the feasibility of conducting the flame effect at the proposed site location. A demonstration utilizing the flame effect(s) at the site may also be required.
  - 3.3 Any modification to a flame effect, addition of flame effect(s), or modification(s) to any of the submitted documents after the Temporary Open Flame Permit application has been reviewed shall require the resubmission of the appropriate application document(s) and additional review of the flame effect(s) prior to NFD approval of the use of the flame effect.
  - 3.4 It is the applicant's responsibility to ensure compliance with all NFD's requirements and guidelines.

## NAFAA Performer Safety Guidelines. (Revision 3.0)

The purpose of this document is to provide a minimum set of voluntary fire performer safety guidelines that attends to the concerns of public health and safety as applied to open flame performance. This document is meant to supplement and clarify the NFPA 160 standards involving 'Group I' devices before an audience. It is not intended to supplant local fire codes, all diligence should be used to discover the local codes for open flame performance.

### Definitions:

- NFPA 160 - National Fire Prevention Agency section 160, Standard for Flame Effects Before an Audience
- Group I- NFPA 160 category for "An attended, manually controlled flame effect."
- Performer - Any personnel who will be handling open flame devices, except for the purposes of extinguishing, while lit. Equated to NFPA 160 "Flame Effects Assistants"
- Troupe Leader - Person in charge of the overall performance, shall be equated to NFPA 160 "Flame Effect Operators"

- I. Performer - all artists should act in a professional manner. They should be capable, well rehearsed, and safe each time they light up.
  - A. Capable
    1. Performers should not attempt performance under the influence of any judgment or reaction impairing substance.
    2. Performers should be in good physical health, with no temporary or permanent debilitating health issue that could interfere with the planned routine.
  - B. Practice
    1. Each performance should be practiced lit several times to verify duration and capability before a performance is attempted.
    2. Troupe leader should verify performers are ready for an audience.
  - C. Costume
    1. Regular performance costumes should be made of flame resistant or high heat material (ie can withstand 800 degrees or more, for more than 3 seconds), if available.
    2. If not, each part of the costume should be checked for flammability, and flame retarded if needed.
    3. Before the performance, the performer should practice lit in the expected costume several times to insure safety.
- II. Safety Personnel - Each performance and lit practice should have at least one spotter ready to meet fire emergency needs, with additional spotters and guards as needed.
  - A. Guards
    1. Guards provide audience containment duties, keeping audience away from performance area, fuel station, and spinout zones.
    2. Fire safety training is beneficial with guards, but not required.
  - B. Spotters
    1. Spotters are in charge of onstage and backstage fire safety including emergent and intentional wick extinguishing.
    2. Spotters should be well aware of the various aspects of fire performance and familiar with the routine to be performed.
    3. Spotters should be trained in flame extinguishing, response times, untangling equipment and audience control.
    4. When needed, the spotter responds to the audience needs, the venue's needs, then the performer's needs, in that order.
  - C. First aid training
    1. Troupe Leader should have strong first aid or medical training.
    2. For particularly large performances, the venue should provide on-call ambulance or medical team for the event who should be aware of the duration of the performance.
  - D. Equipment
    1. Intentional extinguishing can be managed with a safety towel or damp cloth, flame treated cloth, or high heat material.
    2. Spotters should be dressed with the same care as a performer and should have a safety towel at all times.
    3. Ideally, all spotters and guards should have an extinguisher available to them. Extinguisher should at least have a "B" rating, ABC is preferred. Current inspection tag as per local laws is also recommended.
- III. Tools - NAFAA performers should use well-maintained tools. Not only should they be constructed to prevent uncontrolled wicks, they should be regularly tested to insure capability.
  - A. Wick Attachment
    1. Wicks should be attached to the fire tool via some hard limiting method. Wire, screws or bolts should be run through the wick and device. Glues or friction should not be the primary method of wick attachment.
    2. Wicks should be made in such a way as to prevent loss of any part during use, typically by using fireproof materials in construction.
  - B. Handle Attachment
    1. Shafted tools (clubs, staff) should either be made of fireproof materials (metal, carbon fiber, etc) or have a protective covering that extends at least 4 inches beyond typical flame contact zones (for a spinning staff, this is 4 inches in either direction of a wick).
    2. Handles should be attached with much the same care as wicks. Balls or tethers should not depend on glue or friction to remain on the shaft; some hard device should be employed to maintain attachment.
    3. Chain grips should be made of durable materials, or augmented with metal grommets when soft goods (e.g. leather, nylon) are used, and should be thoroughly checked before each use. Any sign of wear should be considered cause for replacement.

- C. Connectors
  1. If the device has multiple connected parts or chains, the connectors attaching all parts together should be of a sealed ring type rated above the maximum possible stress that can be applied to the device.
  2. Any connectors that could be exposed to heat should be made of tempered metal; not plastics, drop forged or spring metal.
- D. Checking
  1. Before each use, the troupe leader should inspect each device to insure that all parts are in good condition and stable. A quick test is to grasp each wick and tug it away from the normal point of contact.
  2. Grips and handles should be thoroughly checked for security and the wicks should be tested thoroughly. Any sign of wear should be treated as a failure.
- E. Fueling - Tools should be soaked, splashed or basted so that excess fuel can be completely recovered and sealed or returned to proper containers
  1. Always spin off excess fuel, in an area free from expected foot traffic and far from ignition sources, before performing.
  2. If available, make use of attachments to catch fuel before hitting the ground, avoiding the spin out zone entirely.
  3. Always mop up oily fuels before leaving. Remove oily residue from performance area between performers. Treat mops, rags, or other cleaning devices as soaked wicks.
- IV. Fuels - The principles of fuel safety are to insure that an uncontrolled burn does not occur, and that the audience and passive safety devices are not affected. Performers should have MSDS for all fuels used and be familiar with any special needs for them.
  - A. Storage and transport
    1. A fuel's original retail container is usually the best choice for storage and transport. Fuels should be kept out of direct sunlight and away from sparks or flame.
    2. If the original container is too bulky or unavailable, then a sealed metal container inside another container is the best overall choice. Canadian performers should use governmentally issued containers of the appropriate type. Insure all fuel containers are accurately and clearly labeled.
  - B. Backstage fuel
    1. All primary fueling should take place in a backstage fueling area.
    2. Backstage fuel stations should be manned by the troupe leader, guard or spotter until completely secured.
    3. Always seal fuel containers and dip buckets when not in use.
    4. When at all possible, place the fuel area outside, behind a hard wall; and have a clear corridor from the fuel area to the stage. Never move wet wicks through the audience without escort. Audience and smoking should be restricted within 30 feet of fuel station.
    5. If a hard wall between fuel and fire isn't available, place a spotter between and insure that fuel containers are sealed before any ignition.
  - C. Open Onstage Fuel
    1. If an onstage fuel reserve is needed, all effort should be made to restrict quantity and capability of accidental spills.
    2. Highly stable metal containers with self-closing lids are preferred
    3. Unneeded fuel (i.e. after use) should be removed immediately.
- V. Performance - Care should be taken to insure that each element of the performance is carried out with safe conditions for the audience and the venue. At no point should either the audience or the venue be at risk of sustaining damages from the performance.
  - A. Separation
    1. Depending on the nature of the audience an adequate separation from the performer should be maintained to prevent accidental contact.
    2. If the performer will be spinning tools, breathing fire, etc, the audience should be sufficiently separated to allow guards or spotters to intercept audience members attempting to enter performance area. Usually 15 feet or a barricade is adequate.
    3. If the performer will be using a tool that is predominantly within their field of vision, implicitly under their control (ex. fire fingers), or the audience does not require excess management (i.e. seated or fenced), then the performer may approach closer pending troupe leader approval.
  - B. Performance area
    1. The performance area should be cleared of all flammable materials, or flammable materials should be treated with approved fire retarding chemicals and tested for combustibility in a safe manner before performance.
    2. Props and other terrain features should be taken into account when designing a performance, performers should not be in danger of contact with foreign objects.
    3. Careful note of sprinkler systems should be made to determine proximity to performance, possible triggers and other specifics.
    4. During outdoor performance, avoid spinning under or near dry foliage.
  - C. Flame toxicity
    1. Petrol fuels burnt on open wicks always produce toxic fumes, smoke, or other health hazards that are augmented in an enclosed space.
    2. Petrol fuel burning should be very limited indoors, even in well-ventilated venues. When possible, use high-proof alcohols in place of petrol fuels.
    3. For outdoor spinning, semi-enclosed areas with low wind can be as hazardous as indoor locations.
    4. Whenever petrol fuels are used, the most purified fuel is preferred.
- VI. Clean Up - Immediately after each performance, fuel buckets should be closed and sealed, fuel returned to approved transport containers, fuel stations locked or removed from premises and any residual fuels mopped up and removed. Hot tools should be wrapped in safety cloth until they cool down. Any exotic materials (i.e. flame retardant) should be removed, locked or guarded.