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OPEN FLAME DEVICES AND THEATRICAL PYROTECHNIC PERFORMANCES

SECTION 1 – GENERAL INFORMATION

The use of open flame devices and theatrical pyrotechnic performances are strictly regulated by the Minnesota State Fire Code (MSFC) and NFPA 160, 2001 Edition.

1.1 Open flame devices

Open flame devices include but are not limited to:

- Open flame decorative devices
- Candles
- Sterno heaters
- Torches for removing paint
- Flaming food and beverage preparation

1.2 The use of open flame devices

No person shall throw or place, or cause to be thrown or placed, a lighted match, cigar, cigarette, matches or other flaming or glowing substance or object on a surface or article where it can cause an unwanted fire. [MSFC 308.2.1]

A person shall not utilize or allow to be utilized an open flame in connection with public meetings or gatherings for the purpose of deliberation, worship, entertainment, amusement, instruction, education, recreation, awaiting transportation or similar purpose in assembly or educational occupancies without first obtaining a permit. [MSFC 308.3]

Heating, lighting, and cooking appliances which utilize Class I liquids shall not be operated within a building or structure. [MSFC 3405.3.3]

Exception: Operation in single family dwellings.

1.3 Open flame decorative devices

Open flame decorative devices shall comply with all of the following [MSFC 308.3.2]:

- Class I and Class II liquids and LP-Gas shall not be used
 - Class I liquids include but not limited to gasoline and camping fuel
 - Class II liquids include but not limited to diesel fuel and kerosene
- Liquid or solid fueled lighting devices containing more than 8 ounces of fuel must self extinguish and must not leak fuel at a rate of more than 0.25 teaspoons per minute if tipped over



- The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at a rate of more than 0.25 teaspoons per minute when the device is not in the upright position
- The device must self right or self extinguish when tipped over
- The flame shall be enclosed except an opening on the side of not more than 0.375 inches or on top with the distance so that a piece of tissue will not ignite after 10 seconds of exposure
- Chimneys shall be noncombustible
- Fuel canisters shall be sealed when not in use
- Storage and handling of combustible liquids shall comply with Chapter 34 of the MSFC

1.4 Location to combustibles

Open flames shall not be located on or near decorative material or similar combustible materials. [MSFC 308.3.3]

- Examples of common combustible materials include but are not limited to paper, streamers, straw, hay, bamboo, leaves, vines, certain plastics, drapes, curtains and similar materials.

1.5 Aisles and exits

Candles shall be prohibited in areas where occupants stand, or in an aisle or exit. [MSFC 308.3.4]

1.6 Religious ceremonies

The use of candles is allowed for religious ceremonies when appropriate safeguards have been taken. The local fire code official will make this determination. [MSFC 308.3.5]

The safeguards the local fire code official may consider are:

- The presence of automatic fire sprinkler systems
- Shields to prevent wax from dripping onto people or materials
- Verbal instructions to those participating in the proper use of the candles

SECTION 2 –THEATRICAL PYROTECHNIC PERFORMANCES

2.1 Theatrical pyrotechnic performances

Where approved by the local fire code official, open flame devices may be used in theatrical performances when adequate safeguards have been taken in accordance with NFPA 160. [MSFC 308.3.6]

2.2 Definitions

- Accumulator – A container or piping that holds a predetermined volume of fuel ready for use in a flame effect
- Direct ignition – An automatic or manual ignition system that ignites fuel without a pilot
- Flame effect – The combustion of flammable solids, liquids or gases to produce thermal, physical, visual or audible phenomena before an audience

- Flame effect burner – A burner designed to produce specific sizes and configurations of flames for flame effects
- Flame effect operator – The single person with overall responsibility for flame effect operations and safety

2.3 Storage

All flame effect materials must be stored in a designated holding area acceptable to the authority having jurisdiction and may not hold more than a single day's performance requirement. [NFPA 160 (01) 2.2.1]

2.4 Approval requirements

The use of flame effects shall be approved by the local jurisdiction. The flame effect plan must include [NFPA 160 (01) 3.3]:

- Name of the group or organization responsible for the production
- Dates and times of the production
- The location of the production
- The design criteria
- A site plan showing the following:
 - A narrative description of the flame effect
 - The location of the flame effect device as well as the controls and control sequence
 - The area affected by the flame effect device
 - The location of the audience
 - The fuels used and their estimated consumption
 - Air for combustion and ventilation for indoor effects
 - Flammable material piping
 - Storage and holding areas and their capacities
 - Supplemental fire protection features
 - Emergency response procedures
 - Means of egress
- A current MSDS for the fuels consumed during the flame effect
- Documentation on the combustible materials used for the construction of the flame effects have been rendered flame retardant
- The name of the effect operator

2.5 Use and handling of flame effects

All flame effect operators must be at least 21 years of age. All flame effect performers, operators, and assistants shall be protected by clothing suitable to the exposure of flame. [NFPA 160 (01) 5.10, 6.4]

The rehearsal, performance and post-show operations shall be conducted in accordance with the plan approved by the authority having jurisdiction. [NFPA 160 (01) 5.5]

The flame effect control systems must comply with NFPA 160 and must meet one of the requirements of a Flame Effect Group I-VII. [NFPA 160 (01) 7.1]

SECTION 3 – ASSEMBLY OCCUPANCIES

3.1 Use of open flame devices

The use of open flame devices in assembly occupancies may only occur under the following conditions [MSFC 308.3.7]:

- Where necessary for ceremonial or religious purposes
- On stage and platforms as a necessary part of a performance when used in accordance with NFPA 160
- Where candles on tables are securely supported on substantial noncombustible bases and candle flames are protected
- Heat producing equipment complying with the Minnesota State Mechanical Code
- Gas lights are permitted with the local fire code official approval.

If you have additional questions or need further information on the requirements for open flames devices and theatrical pyrotechnic performances, please contact the State Fire Marshal Division at 651-201-7200, visit our web site at www.fire.state.mn.us or e-mail your questions to firecode@state.mn.us.