

# Display Fireworks Inspections

## Display Fireworks Inspection Guide

### Definitions:

- 1) Discharge site: the area immediately surrounding the fireworks mortars used for an outdoor fireworks display.
- (2) Display site: the immediate area where a fireworks display is conducted, including the discharge site, the fallout area, and the required separation distance from mortars to spectator viewing areas, but not spectator viewing areas or vehicle parking areas.
- (3) Fallout area: the designated area in which hazardous debris is intended to fall after a pyrotechnic device is fired.
- (4) Aerial shell: a cartridge containing pyrotechnic composition, a burst charge, and an internal time fuse or module that is propelled into the air from a mortar and that is intended to burst at or near apogee.
- (5) Chain fusing: a series of two or more aerial shells fused to fire in sequence from a single ignition.
- (6) Mortar: a tube from which certain aerial devices are fired into the air.
- (7) Mortar rack: a frame containing one or more mortars.
- (8) Mortar trough: aboveground structure filled with sand or similar material into which mortars are positioned.
- (9) NFPA: National Fire Protection Association

### Site Plan

Applicant shall submit a detailed site plan, to include but not be limited to distance requirements per NFPA, firing method, mortar installation and product being used along with the name of the licensed or pyrotechnic display operator.

### Display Operator

Effective August 28, 2004, Missouri State Statute (RSMO. 320.126.4) became law requiring all fireworks displays “shall be supervised, managed, or directed by a Missouri licensed operator or pyrotechnic operator on site”. Operators must be licensed by the Division of Fire Safety.

# Display Fireworks Inspections

**Assistants-** shall be at least 18 years old

## **Insurance**

Permit applicant shall submit proof of insurance coverage insuring the applicant with liability insurance in order to satisfy claims for damages to property or personal injuries arising out of any act or omission on the part of such person, firm or corporation or any agent or employee thereof with an occurrence limit of not less than one million dollars.

## **Site Safety/Security**

The licensed pyrotechnic display operator shall have primary responsibility for safety.

Any time fireworks or pyrotechnic materials are on location, they shall not be left unattended or unsecured.

Monitors shall be positioned around the display site to prevent spectators or any other unauthorized persons from entering the display site.

Where required by the Authority Having Jurisdiction (AHJ), approved delineators or barriers shall be used to aid in crowd control.

## **Mortar Inspection**

- a. Mortars shall be inspected prior to placement.
- b. Defective mortars shall not be used.
- c. Mortars shall be positioned and spaced so that shells are propelled over the fallout area and to afford maximum protection to the shooter and loader.
- d. Where mortars are to be reloaded during a display, the following procedures shall be followed:
  - (1) Mortars of various sizes shall not be intermixed.
  - (2) Mortars of the same size shall be placed in groups, and the groups shall be separated from one another.

## **Mortar Installation**

- a. Mortars shall be buried to a depth of at least two-thirds of their length, either in the ground or in aboveground troughs or drums.
- b. Mortars that are to be reloaded during the display shall be buried to a depth between two-thirds and three-quarters of their length, either in the ground or in aboveground troughs or drums.
- c. Where buried mortars are to be fired more than once during a display, the mortars shall be placed to prevent them from being driven into the ground or re-angled when fired.

# Display Fireworks Inspections

- d. Mortars that are buried in the ground, in troughs, or in drums shall be separated from adjacent mortars by a distance at least equal to the diameter of the mortar.
  - (1) If electrical ignition of unchained aerial shells 6 inches and less in diameter is used, no separation of mortars is required.
  - (2) If troughs and drums are used, they shall be filled with sand or soft dirt and, in all cases, shall be free of stones or other potentially dangerous debris.
  - (3) Troughs shall be reinforced or braced in a minimum of two places on the sides at intervals not greater than every 4 feet.
  - (4) Mortars in troughs or drums shall be positioned to afford the maximum protection to the shooter.
  - (5) In all other cases, a separation distance of at least 2 inches or one-half the diameter of the mortar, whichever is greater, shall be required between the mortar and the wall of the trough or drum.
  - (6) Where electrical ignition is used, all mortars placed in troughs or drums shall be spaced at least 2 inches from the wall of the trough or drum.

## Mortar Loading/Reloading

- a. There is no limit to the number of times a steel mortar 6 inches or less is permitted to be reloaded.
- b. Any other type of mortar 6 inches in diameter or less shall be permitted to be reloaded and fired up to seven times during a performance.
- c. Mortars shall be positioned to afford protection to the spectators and display personnel.
- d. Mortars shall be inspected before the first shells are loaded to ensure that no water or debris has accumulated in the bottom of the mortar.
- e. Single-break salute shells shall be fired from nonmetallic mortars.
- f. Mortars shall be of sufficient strength and durability to fire the aerial shells and to be used safely.
  - (1) Paper, HDPE, and fiberglass mortars shall be permitted to be used.
  - (2) Metal mortars shall be permitted to be either seamed or seamless.
  - (3) Cast iron, stove pipe, corrugated culvert, clay, bamboo, and wood shall not be used to make mortars

## Rack Inspection

- a. Single-break shells not exceeding 6 inches in diameter shall be permitted to be fired from securely positioned mortar racks.
- b. Single-break shells greater than 8 inches in diameter and multiple-break shells shall not be fired from mortar racks.
- c. Single-break shells that are 7 inches or 8 inches in diameter that are fired from mortar racks shall meet the following conditions:
  - (1) The mortar is not metallic.
  - (2) Electrical or equivalent means of remote ignition is used to fire the shell.
  - (3) The shell is not chain fused to any other shells.
- d. Mortar racks and bundles shall be constructed and installed to hold multiple mortars in

# Display Fireworks Inspections

- position during normal functioning.
- e. Mortar racks or bundles that are not inherently stable shall be secured or braced by means of stakes, legs, A-frames, sideboards, or equivalent means.
  - f. Wherever more than three shells are to be chain fused, additional measures shall be required to prevent adjacent mortars from being repositioned in the event that a shell explodes in a mortar, causing it to burst.
  - g. For mortars in racks, prevention of repositioning shall be accomplished by using mortar racks that are designed to withstand a shell exploding in a mortar, which causes the mortar to burst.
  - h. Where there is doubt concerning the strength of racks holding chain-fused mortars, the separation distances from those racks to spectators shall be twice required for buried mortars for the largest mortar in the sequence.
  - i. Chain-fused mortar racks shall comply with the following:
    - (1) Racks containing mortars 3 inches or less in diameter shall be limited to a maximum of 15 mortars per unit.
    - (2) Racks containing mortars 4 inches in diameter shall be limited to a maximum of 12 mortars.
    - (3) Racks containing mortars 5 inches to 6 inches in diameter shall be limited to a maximum of 10 mortars.
    - (4) Racks shall not be used for mortars greater than 6 inches in diameter.
    - (5) These requirements shall not apply to boxed finale items containing tubes 2.5 inches or less in diameter only.
    - (6) Mortars shall not be permitted to be reloaded with chain-fused aerial shells.

## Drum/Trough Inspection

Mortars in troughs or drums shall be positioned to afford the maximum protection to the shooter.

## Display Area Inspection:

- a. The minimum required radius of the display site and the minimum spectator separation distance from the point of discharge of each firework shall be 70 feet per inch of the internal mortar diameter of the largest aerial shell to be fired.
- b. For ground display pieces of low hazard potential, the minimum radius shall be 75 feet.
- c. Distances from the point of discharge of any firework to a health care or detention and correctional facility shall be at least twice the radius distance.
- d. The distance between the discharge site and bulk storage areas of materials that have a flammability, explosive, or toxic hazard shall be twice the radius.
- e.. No spectators or spectator parking areas shall be located within the display site.
- f. Dwellings, buildings, and structures shall be permitted to be located within the display site with the approval of the AHJ and the owner of the property, provided that the structure is unoccupied during the display, or if the structure is of noncombustible or fire-resistant construction.

# Display Fireworks Inspections

g. The area selected for the discharge of aerial shells shall be located so that the trajectory of the shells shall not come within 25 feet of any overhead object.

## **Fallout area**

- a. Shall be an open area.
- b. Spectators, unauthorized vehicles, watercraft, or readily combustible materials shall not be located within the fallout area during the display.
- c. Emergency response personnel and their vehicles shall remain at or beyond the perimeter of the display site during the actual firing of the display

## **Ready Boxes**

A ready box shall be a portable, weather-resistant container that protects contents from burning debris with a self-closing cover or equivalent means of closure.

- a. **Tarpaulins shall not be used as ready boxes**
- b. Manually fired shells used to reload mortars shall be stored in ready boxes and shall be separated according to size and designation as salutes.
- c. During the performance of an outdoor fireworks display, ready boxes shall be located at a distance not less than 25 feet upwind from the mortar placements.