

FIRE DEPARTMENT • CITY OF NEW YORK



STUDY MATERIAL FOR THE EXAMINATION FOR  
CERTIFICATE OF FITNESS  
FOR

# Pyrotechnic Apprentice – Class C

## **E-27**

**\*Test available starting November 2, 2015**

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## **NOTICE OF EXAMINATION**

**Title:** Certificate of Fitness for Pyrotechnic Apprentice (E-27)

**Date of Exam:** Written exams are conducted Monday through Friday (except legal holidays) 8:00 AM to 2:30 PM.

### **REQUIREMENTS FOR WRITTEN EXAM**

Applicants who need to take the exam must apply in person and bring the following documents:

1. Applicants must be at least 18 years of age.
2. Applicants must have a reasonable understanding of the English language.
3. Applicant must provide two forms of identification; at least one piece of identification must be government issued photo identification, such as a State-issued Driver's License or Non Driver's License or a passport.
4. Applicants must present a letter of recommendation from his/her employer. The letter must be on official letterhead, and must state the applicant's full name, experience and the address where the applicant will work. If the applicants are self-employed or the principal of the company, they must submit a notarized letter attesting to their qualifications. For more info:  
[http://www.nyc.gov/html/fdny/html/c\\_of\\_f/cof\\_requirements.shtml](http://www.nyc.gov/html/fdny/html/c_of_f/cof_requirements.shtml)
5. Applicants must present a completed application for certificate of fitness (A-20 Form). <http://www.nyc.gov/html/fdny/pdf/a20.pdf>
6. Special Requirements:
  - a. Must be a U.S. Citizen
  - b. To qualify and make an appointment: paperwork must be submitted in advance to Explosives Unit
  - c. Must have resume detailing experience
  - d. \$75 fingerprinting fee
  - e. Must bring 2 passport photos

### **APPLICATION FEES:**

The \$25 application fee for the exam can be paid by one of the following methods:

- Cash
- Credit card (*American Express, Discover, MasterCard, or Visa*)
- Debit card (*MasterCard or Visa*)
- Personal or company check or money order (*made payable to the New York City Fire Department*)

For fee waivers submit: (*Only government employees who will use their C of F for their work-related responsibilities are eligible for fee waivers.*)

A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; *AND* Copy of identification card issued by the agency.

*A convenience fee of 2.49% will be applied to all credit card payments.*

### **EXAM INFORMATION**

The E-27 exam will consist of 20 multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limited exam. A passing score of at least 70% is required in order to secure a Certificate of Fitness. Call (718) 999-1595 for additional information.

Please always check for the latest revised booklet at FDNY website before you take the exam.

[http://www.nyc.gov/html/fdny/pdf/cof\\_study\\_material/e\\_27\\_st\\_mat.pdf](http://www.nyc.gov/html/fdny/pdf/cof_study_material/e_27_st_mat.pdf)

If all the requirements are met and applicant passes the exam a certificate will be issued the same day. Applicants who fail the exam will receive a failure report. To retake the exam applicants will need to submit a new application and payment.

**Special Note:** Exam will also consist of a series of verbal questions.

### **RENEWAL REQUIREMENTS**

All renewals must go through the Explosives Unit in order to verify criminal background.

Please note that in person renewals are not recommended. Call the Explosives Unit for more information.

E-27 Certificates of Fitness are valid for a period of **one year** from the date of issuance. At the end of this period, the certificate expires unless the commissioner approves its renewal. Please be advised that certificate renewals shall be at the discretion of the commissioner in the interest of public safety. The department may review the certificate holder's qualifications and fitness. E-27 holders must ensure that their original Certificate of Fitness card is available for inspection at all times by the FDNY.

The renewal fee is \$5. FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications. Certificate of Fitness can be revoked at any time.

You may receive a courtesy notice of renewal 90 days before the expiration date. However, it is your responsibility to renew your Certificate. It is very

important to renew your C of F before it expires. Renewals submitted 90 days (up to one year) after the expiration date will incur a \$25 penalty in addition to the renewal fee. Certificates expired over one year past expiration date will not be renewed a new exams will be required.

**To change a mailing address:**

Submit a letter requesting the change of mailing address and a copy of your C of F and a \$5.00 fee.

**To change a work location,**

Submit a letter from your current employer (on company letterhead) confirming that you are an employee and stating your new work location with a copy of your C of F and a \$5.00 fee.

**To request a replacement certificate:**

Submit a driver's license or passport, social security number and mailing address and a \$5.00 fee.

The certificate can be renewed On-line or Mail.

**Renewal online**

If you are an individual, make sure you have your 12 digit Certificate of Fitness Access ID. This can be found on your Renewal Notice. If you do not have your Renewal Notice, your Access ID is your 8 digit Certificate of Fitness number and the last four digits of your social security number.

**Renewal fee can be paid by one of the following methods:**

- Credit card (American Express, Discover, MasterCard, or Visa)
- Debit card (MasterCard or Visa)
- E-check

Fee exempted applicants cannot renew online only by mail or in person.

If all the requirements are met, the certificate of fitness will be mailed out within 10 days.

For online renewal go to:

<https://paydirect.link2gov.com/FDNYCOF/ItemSearch>

**Renewal by mail**

Mail your Renewal Notice (if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment Personal or company check or money order (made payable to the NYC Fire Department)

**For fee waivers submit:** *(Only government employees who will use their C of F for their work- related responsibilities are eligible for fee waivers.)*

A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; *AND*

Copy of identification card issued by the agency and if applicable, supporting documents to:

**NYC Fire Department (FDNY)**

Explosives Unit

9 MetroTech Center, 1st Floor

Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be mailed out within four to six weeks.

## **ABOUT THE STUDY MATERIAL**

This study material will help you to prepare for the written examination for the E-27 Certificate of Fitness exam for a Pyrotechnician Apprentice Class C. This study material includes information taken from the New York City Fire Code as well as industry safety standards. The study material does not contain all the information you need to know in order to perform the responsibilities of minor special effects safely. It is your responsibility to become familiar with all applicable laws, rules and regulations of the federal, state and city agencies having jurisdiction, even though such requirements are not included in this study material. You need to be familiar with New York City Fire Code Chapter 33, Section 3309 which regulates the use of special effects. **It is critical that you read AND understand this booklet to help increase your chance of passing this exam.**

## **ABOUT THE TEST**

You must pass a multiple choice and verbal test to qualify for the certificate of fitness. A score of 70% correct is required in order to pass the multiple choice section of the test. All questions have four answer options. Only **one** answer is correct for each question. If you do not answer a question, or if you mark more than one answer to a single question, your answer to that question will be scored as incorrect. Read each question carefully before marking your answer. There is no penalty for guessing.

## **SAMPLE QUESTIONS**

**Which of the following are allowed to be used while taking a Certificate of Fitness examination at 9 Metro Tech Center?**

- I. cellular phone
  - II. study material booklet
  - III. reference material provided by the FDNY
  - IV. mp3 player
- 
- A. III only
  - B. I, II, and III
  - C. II and IV
  - D. I only

Only reference material provided by the FDNY is allowed to be used during Certificate of Fitness examinations. Therefore, the correct answer would be A. You would touch "A" on the computer terminal screen.

**If the screen on your computer terminal freezes during your examination, who should you ask for help?**

- A. the person next to you
- B. the firefighters
- C. the examiner in the testing room
- D. the computer help desk

If you have a computer related question, you should ask the examiner in the testing room. Therefore, the correct answer would be C. You would touch "C" on the computer terminal screen.

**If you do not know the answer to a question while taking an examination, who should you ask for help?**

- A. the person next to you
- B. the firefighters
- C. the examiner in the testing room
- D. you should not ask about test questions since FDNY staff cannot assist applicants

You should not ask about examination questions or answers since FDNY staff cannot assist applicants with their tests. Therefore, the correct answer would be D. You would touch "D" on the computer terminal screen.

## **1. Introduction**

Special effects, even minor effects, are not only used for theatre productions, television, and motion pictures but also for special events to either enhance production or to simulate real events that may be too dangerous or unreasonable to perform without appropriate supervision.

Special Effects are also used for entertainment purposes such as magic shows and stage performances.

Using special effects anywhere is dangerous, especially in a heavily populated city such as New York. Improper use or storage of equipment, chemicals, and explosives creates a risk to individuals and property.

It is important when working with all pyrotechnic devices and chemicals that the Material Safety Data Sheet/ Safety Data Sheet is available.

Minor special effects include smoke effects, cryogenic/compressed gas effects, minor flame effects, theatrical ammunition and fire performances. Other effects used may require a higher level Certificate of Fitness.

All required FDNY permits and Certificate of Fitness must be obtained prior to performing any special effect. Additionally, every Certificate of Fitness holder must have his or her valid certificate in possession (not expired E-27) while performing any kind of special effect. The performance of any special effect without FDNY approval, permits, or a valid certificate of fitness is unlawful and subject to disciplinary action.

## **2. Worst Case Scenarios**

### **Fire breathing stunt actor in critical condition after onstage accident**

*Chicago, February 2013*

A fire-breathing stilt-walker is in a critical condition after a freak accident saw his head catch fire during a rehearsal.

An audience of 1,000 horrified guests watched as flames engulfed Wesley Daniel's face after his dangerous stunt during practice for a Lyric Opera of Chicago production went wrong.



At first they thought it was part of Monday evening's show, but soon realized the 24-year-old was in serious trouble when he stumbled across the stage and collapsed.

"His head was engulfed in flames and he was center stage and in a panic," an audience member stated. "He was trying to put it out and then moved as quickly as he could on stilts but then he had no choice but to just fall down." Daniel was rushed to Northwestern Memorial Hospital, battling respiratory problems and suffering second degree burns to his face and throat and first degree burns to his hands.

"I don't think he closed his mouth quick enough," stated another onlooker. ***"So the fire, the stuff in his mouth, came on his clothes and so did the fire, and it also dribbled all over the floor so we saw a line of fire across the stage."***

"He was wearing a flameproof costume and mask. Lyric's emergency plan was activated immediately. Trained fire guards extinguished minor flames immediately," the statement read.

Lyric personnel called 911 and paramedics reportedly arrived within minutes. Even though local media reports that the stunt had been approved by the Chicago Fire Department, the decision was made to remove the fire-spitting effect from performances."



### **Undertaker burned by his pyro during the Elimination Chamber pay-per-view**

*Feb 21, 2010*

Mark William Calaway, the 44-year-old Texan who wrestles under the name The Undertaker for the WWE, was injured by flames during a pay-per-view special. Part of The Undertaker's grand entrance includes flames shooting up from the stage. Unfortunately, one of those flames was ignited while he was standing in that spot. The Undertaker removed his jacket after being burned and tossed it to the

floor where it burst into flames.

***A miscue of the pyrotechnics caused the accident during the Elimination Chamber event.***

In spite of his injuries, The Undertaker chose to continue his performance at the Elimination Chamber event. He wrestled for a full 30 minutes while dousing himself with water off camera.

### **Halle Berry hurt in blast during Bond film scene**

*April 2002*

THE Oscar-winning actress Halle Berry was injured in Spain while filming her starring role in the new James Bond movie Die Another Day.

Berry, 33, was being directed in a risky scene which involved her co-star Pierce Brosnan, playing Agent 007, shooting down a helicopter.

Many explosions took place as the stuntmen flew the helicopter in dangerous maneuvers. ***A piece of debris from a smoke grenade flew into Berry's left eye.***

The Hollywood star was “quite lucky” as it didn’t leave her with any lasting damage and the fragment was removed from her eye in a 30-minute operation, in a nearby clinic.

## Horror Stuns the Circus Acrobat Accidentally Sets Himself on Fire

*Madison Square Garden, New York*

*April 14, 1998*



The Greatest Show on Earth became a circus of horrors yesterday when an acrobat accidentally set himself ablaze as thousands of stunned parents and wide-eyed children

looked on. Peals of laughter turned to screams of terror as the Ringling Bros. and Barnum & Bailey Circus performer caught fire while jumping a flaming rope in a grass skirt. Jacques Mbembo, 24, was in serious condition last night at New York Hospital-Cornell Medical Center with second and third-degree burns over 20% of his body, officials said.

A group in traditional Gabonese garb of leopard skin and grass skirts was jumping a burning rope when Mbembo's skirt lit up, witnesses said. "He dropped to the ground and rolled around. Other performers kept up the act but when the flames wouldn't go out, he ran out of the room with the grass on fire. At least two circus workers said there was an off-stage scramble for fire extinguishers as Mbembo burned. **They said the extinguishers were supposed to be next to the center ring, but were misplaced.** Mbembo did at least one somersault as he desperately tried to douse himself, witnesses said. After several panicked moments, an assistant ringmaster in a tuxedo ran to Mbembo with a fire extinguisher and put out the flames.

## Actor and two children killed on set

*The Twilight Zone: The Movie (1983)*



On the last scheduled day of the filming of a segment of the 1983 movie [The Twilight Zone](#), actor Vic Morrow (age 53) and child actors Myca Dinh Le (age 7) and Renee Shin-Yi Chen (age 6) died in an accident involving a helicopter. **The helicopter was flying too low to avoid the explosions of the pyrotechnics being used.** When the blasts severed the tail rotor, it spun out of control and crashed, decapitating Morrow and Le with its blades. Chen was crushed as the helicopter crashed.

The accident led to legal action against the filmmakers which lasted nearly a decade, and changed the regulations involving children working on movie sets at night and during special effects-heavy scenes.

## **Bruce Lee's Son, Brandon, Killed in Movie Accident**

*Wilmington, N.C*

1993

Brandon Lee (son of Bruce Lee) died of a gunshot wound on March 31, 1993 at the filming studio in Wilmington, North Carolina, at the age of 28, after an accidental shooting on set of *The Crow*.

In the fatal scene, which called for the revolver to be actually fired at Lee from a distance of 12–15 feet, ***the dummy cartridges were exchanged with blank rounds, which feature a live powder charge and primer, but no bullet, thus allowing the gun to be fired without the risk of an actual projectile. But since the bullet from the dummy round was already trapped in the barrel, this caused the .44 Magnum bullet to be fired out of the barrel with virtually the same force as if the gun had been loaded with a live round,*** and it struck Lee in the abdomen, mortally wounding him.

### **3. Definitions**

**BLANK AMMUNITION** (*Theatrical Ammunition*). A type of ammunition for a firearm that contains gunpowder but no bullet or shot.

**COMBUSTIBLE.** Capable of being burned. Can be fiber or liquid.

**CRYOGENIC.** A fluid having a boiling point lower than -130°F at 14.7 pounds per square inch absolute (psia) (an absolute pressure of 101.3kPa).

**CYROGENIC CONTAINER.** A pressure container, low-pressure container, or atmospheric container of any size designed or used for the transportation, handling, or storage of cryogenic fluid, and which utilizes venting, insulation, refrigeration or a combination thereof to maintain the pressure within design parameters for such containers and to keep the contents in a liquid state.

**DANGER AREA.** The immediate area surrounding the special effect or pyrotechnic performance. The distance of the danger area depends on the actual effect that is taking place.

**DRY ICE.** The solid form of carbon dioxide. It is primarily used as a cooling agent but often used to create theatrical/performance fog.

**ELECTRIC MATCH.** is a device that uses an externally applied electric current to ignite a combustible compound.

**FLAME PASTE.** Flammable paste that burns with an orange flame.

**FLAMMABLE.** easily ignited and quick burning. Can be in liquid or solid form

**FLAMMABLE CYROGENIC FLUID.** A cryogenic fluid that is flammable in its vapor state.

**FLASH CLOTH.** A cotton based material which is stronger than the traditional flash paper but produces the same orange flame effect with no residue. It can be sewn into objects allowing the designer to create different effects.

**FLASH CORD.** Popular for magician's tricks. It burns quick with a bright orange flame and vanishes without residue.

**FLASH COTTON.** Creates an instantaneous flash and burns very quick

**FLASH PAPER.** Paper made from nitrocellulose and burns very quickly and completely with a bright orange flame that leaves no ash.

**FOG.** Created by glycol or glycol/ water mixtures heated until the fluid vaporizes creating a thick translucent or opaque cloud of liquid droplets.

**GENERAL SUPERVISION.** Supervision by the Certificate of Fitness holder who is responsible for performing the duties of the certificate holder but need not be personally present on the premises at all times. When using hazardous special effect materials, when COF is not present, material must be ***locked and secured.***

**HANDLING.** The movement of a material in its container, the removal of the material from its container, or any other action or process that may affect the material, other than its storage or use.

**HAZE.** an unobtrusive cloud made of liquid droplets that are intended to primarily reveal lighting beams. Similar to fog, it can be created with a glycol/water mixture.

**HEALTH HAZARD.** A classification of a chemical for which there is a statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. the term “health hazard” includes chemicals that are toxic, highly toxic and corrosive.

**LIQUID.** A material having a melting point that is equal to or less than 68°F and a boiling point that is greater than 68°F at 14.7 psia. When not otherwise identified, the term “liquid” includes both flammable and combustible liquids.

**LOW LYING FOG.** A thick fog that stays close to the ground. As it is warmed or agitated, rises and gradually disappears.

**LYCOPodium POWDER.** Is a fine yellow powder derived from the spores of a plant that can be used for fire effects.

**MATERIAL SAFETY DATA SHEET/ SAFETY DATA SHEET (MSDS/SDS).** A document prepared in accordance with the regulations of the United States Department of Labor, as set forth in 29 CFR Part 1910.1200 or a federally approved state OSHA plan which sets forth information concerning a hazardous material. It contains health and physical hazards of the material used, procedures that should be followed in case of an emergency and safety work practices. MSDS does not show the cost of the hazard.

**PERMIT.** A written statement issued by the commissioner authorizing the manufacture, storage, handling and use or transportation of hazardous

materials, or other material, or to conduct an operation or to maintain a facility, for which a permit is required by the NYC Fire Code.

**PERSONAL SUPERVISION.** Supervision by a Certificate of Fitness holder who is required to be personally present on the premises, or other proximate location acceptable to the FDNY, while performing the duties for which the certificate is required.

**PERSONAL PROTECTIVE EQUIPMENT (PPE).** Protective clothing, helmets, goggles, or other garments or equipment designed to protect the user from bodily injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne matter.

**PROXIMATE AUDIENCE.** An audience closer to pyrotechnic devices than allowed by NFPA 1123.

**PYROTECHNIC ARTICLE OR DEVICE.** Any article or device containing a pyrotechnic material.

**PYROTECHNIC MATERIAL.** A chemical mixture consisting predominantly of solids that, upon ignition, are capable of producing a controlled, self-sustaining, and self-contained exothermic reaction, that functions without external oxygen, resulting in a visible or audible effect by combustion, deflagration, or detonation.

**SMOKE.** Atmospheric effect composed of solid particles released during combustion. Produced by either pyrotechnic materials or other flammable substances.

**SPECIAL EFFECT.** A visible or audible effect used for entertainment or other display purposes, created by any material, article or device of an explosive, flammable or combustible nature, including pyrotechnic materials, articles and devices and fireworks, 1.4G, but excluding fireworks, 1.3G.

#### **4. Permits**

Permits must be kept on the premises at all times. It must be readily available for inspection by any FDNY or NYPD employee.

A permit is required to store, handle or use any quantity of special effects.

A special effects permit shall be obtained for each display or other event involving the conduct of a special effect by the sponsor of the display or other event or, with the sponsor's written authorization, by a person holding a Certificate of Fitness for special effects (E-27).

### **Keep in mind that permits are site specific.**

A special effects permit shall be issued in the name of the applicant and shall specify the name of the sponsor, the date, time and location of the display or other event, the number and kind of pyrotechnic articles or devices to be discharged or otherwise used, or other materials, articles or devices used to create the special effects, and such other terms and conditions as the commissioner may prescribe as necessary or appropriate for the safe conduct of the display or other event.

The commissioner may issue a special effects permit to a television, motion picture or theatrical production company that regularly conducts special effects at a designated location within a specific building or structure.

In order to apply for a special effects permit, a Letter of Intent/ Permit Application is required. Information on the Letter of Intent/Permit application can be found in Section 13 of this document.

Other permits may be necessary for production or performance (i.e. a permit for the use of a fire hydrant). You must check with other agencies such as the Department of Buildings (DOB), Department of Labor (DOL), New York State, or the Temporary Place of Assembly (TPA) Unit of the FDNY.

## **5. General requirements for Special Effects**

As a safety requirement, the Pyrotechnic Apprentice E-27 Certificate of Fitness holder must be dedicated to one specific task at a time regardless of what anyone else may request. No pyrotechnic task can be left without supervision.

It is also important to have an assistant to serve as a “watch person” when conducting special effects.

There are several general safety requirements put forth in the NYC Fire Code that must be followed when conducting special effects.

- The quantity of the materials and/or devices used must be the **minimum** amount necessary to produce the desired effect.
- The FDNY Commissioner may require a demonstration of the materials and/or devices used to create a special effect.
- The FDNY Commissioner may require Fire Department personnel and apparatus to monitor the preparation and use of a special effect in the interest of public safety.
- The FDNY Commissioner may state that there is a **maximum** amount of special effect materials and/or devices that are allowed to be stored in

any approved facility. The location and design of the facility must be approved by the FDNY Commissioner.

- All special effect materials and/or devices must remain in their approved containers until required for use (while in temporary storage)
- The shortest time practical must be used between the time of removal from storage to the actual use of the special effect
- Never leave any pyrotechnic material and/or devices unattended unless it is in a secured storage facility.
- If pyrotechnic material is removed from its original packaging, the replacement container must be properly labeled
- Always protect utilities when indoors (such as sprinkler heads, electrical wiring, etc...)

### REMEMBER

- **No product can be loaded until it has been inspected and approved by a FDNY Explosives Unit Inspector.**
- **It is necessary to notify FDNY Explosives Unit if there are any changes being made to the setup or products being used.**

## **6. Smoke Effects**

There are several different ways that smoke can be created for entertainment purposes. Smoke can be created by pyrotechnic materials such as smoke cookies, or smoke cartridges, compressed gases, smoke grenades, flammable substances such as incense or smoke pencils/pens or a combination of chemicals and machines, each with its own degree of hazard.

All smoke and fog effects run the risk of inhalation and asphyxiation dangers. Most are only used for a short period of time, which limits the dangers that come with the length of exposure. When using smoke, fog or haze effects in a

confined spaces, always keep proper ventilation to avoid potential respiratory issues that can be contributed to long term exposure.

When using smoke effects it is advised to conduct a smoke test. A smoke test can be used to determine the distance smoke will carry and what smoke detectors may need to be taken offline for the duration of the effect.

When fire alarm systems are disabled it is very important to have the Fire Safety Director along with fireguard(s) and/or a Fire Department Representative must be present in order to maintain the safety of the property and people present. The number of fireguards required varies according to building size, layout, and amount of people present. Whereas the amount of fire extinguishers required varies according to effect being conducted. A Fire Department representative will determine the amount of fireguards and extinguishers required to perform the effect safely. Smoke effects should never obscure egress; exit signs and paths must always be visible.

Smoke effects can be classified into three categories: smoke, fog and haze.

### **Smoke**

a. Smoke generating devices

There are several smoke generating devices that are based on zinc chloride such as *smoke cookies*. According to the Department of Transportation, smoke cookies are classified as a flammable solid. The smoke is created by heating or burning the product.

b. Smoke gun

is a handheld smoke machine that requires no electricity to work. It can be used to create large amounts of smoke using gas cartridges. They are commonly used to create a foggy atmosphere or to add to fire scenes. For safety reasons, they should never be pointed directly at anybody.



Proper PPE should always be used when using a smoke gun. It is important to remember that they generate a lot of heat while in use and should be allowed to cool before being handled and never placed near combustible materials.

Smoke guns should *always* be held upright and checked for leaks before each use.

c. Ammonium chloride is another common way smoke is created for on stage as well as outdoors. It is not recommended for indoor use or use within an enclosed space as it generates hydrochloric acid when dissolved in the respiratory system.

- d. Burning organic material creates smoke but also the hazard of an open flame. Frankincense, paper, and other materials are often used to create a smoke effect.

## **Fog**

Fog may be one of the most widely used special effects in theatres; there are several ways fog can be generated.

- a. Glycol and glycol/water mixture

Fog is generated by using fog fluid (glycol or glycol/water mixture) with a heat exchanger to heat the liquid until it vaporizes creating a thick dense cloud. Sometimes, a thermal fogger (similar to pesticides) with a petroleum product (i.e. fuels, kerosene or other petroleum distillate) is used for fog effects. The fogger ignites the fuel and mixes air and glycol or glycol/water to create a dense fog.



*Low lying fog machine*

- b. Dry Ice (Solid Carbon Dioxide)

It is considered one of the safest ways to create a low lying fog in an enclosed space. Dry ice is frozen carbon dioxide that when exposed to air, changes from a solid to a gas. This also causes a low lying thick fog.

Dry ice can also create fog when it is combined with water near boiling. At atmospheric pressure carbon dioxide cannot exist as liquid and it instantaneously produces gas creating a thick white fog.



*Dry ice in water*



When stored in a sealed container with water, dry ice can form a bomb that will result in flying shards which are dangerous and can cause blunt force trauma and hearing damage.

Dry ice can burn skin and ingesting it can also be a hazard to one's health.

c. CO<sub>2</sub> (Carbon Dioxide: Liquid/Gas)

Liquid carbon dioxide stored in compressed cylinders can be used with fog machines to create a low lying fog effect. Liquid CO<sub>2</sub> is used to chill fog which keeps it low to the ground. As it warms it will rise and gradually disappears.

CO<sub>2</sub> as a gas used in a cryojet, produces large amounts of dense white smoke that is odorless and disappears almost immediately. The smoke is odorless

d. N<sub>2</sub> (Nitrogen: Liquid)

Similar to dry ice, liquid nitrogen creates a low lying fog effect. Liquid nitrogen is pumped into a closed container containing boiling water (steam) creating a thick dense fog. The effect of a rolling fog that lies close to the ground can be made with the use of a fan placed at the output of the container, directing the fog where it is needed. Also known as a dry fog because even though it is created with water droplets, as it disappears there is little to no liquid left behind.

### Haze

A haze effect is a light cloud effect usually used in conjunction with lighting beams. Haze effects are usually produced by a haze machine in one of two ways. Either by using a mineral oil spray pump electrically powered or using compressed CO<sub>2</sub> or using glycol/water, similar to a fog effect. If only a small amount of haze is needed, it can be produced with aerosol canisters that contain mineral oil under pressure.

### Safety with smoke effects:

- **Always** make sure that permits and certificate of fitness are current.
- **Always** have the MSDS/SDS for all products on hand.
- **Always** inform everyone involved in the production in advance when there will be smoke, fog and haze in use and the type that will be used.
- **Always** discuss the hazards and safety precautions that will be taken while the hazards are in use.

- **Always** use the minimum concentration of smoke for the minimum period of time necessary. That way the members of the production team are not exposed to heavy concentrations
- **Only** allow the essential production personnel in the vicinity when smoke, fog and haze are in use. Be mindful that you may have to evacuate areas where smoke, fog or haze can travel
- **Always** use respirators and proper PPE when using chemicals for smoke, fog or haze, especially in enclosed areas
- **Always** maintain adequate ventilation, quickly exhaust excess smoke, fog or haze when indoors.
- **Always** have a fire guard on hand when burning materials for smoke effects
- **Never** crouch down or lie down in dry ice fog effects. Carbon dioxide gas can cause asphyxiation.
- **Always** use proper labels and color designation for CO<sub>2</sub> and nitrogen canisters
- **Always** replace caps and securely strap canisters of CO<sub>2</sub> and nitrogen for safety.

## **7. Compressed and Cryogenic Gas Effects**

Most compressed gases are toxic or highly toxic. Compressed gases are gases and mixtures of gasses stored under pressure in cylinders. There are 3 major groups of compressed gas: liquefied gases, non-liquefied gases, and dissolved gas.

### a. Liquefied Gases

A liquefied gas is a gas that is kept in a cylinder that is almost full with liquid under pressure. Gas fills the space above the liquid in the cylinder and as the gas is removed enough liquid evaporates to replace it, keeping the pressure constant. Some examples of liquefied gases are anhydrous ammonia, chlorine, propane, nitrous oxide and carbon dioxide. The gases above can be used for freeze, smoke, fog, air blast and flame effects.

### **NOTE:**

\*Propane cylinders must be recertified every 12 years. The recertification is an inspection process so that it continues to be safely operable.

\*A permit is required to handle more than 47 pounds (lbs.) of propane gas.

\*Any vehicle carrying propane must be DOT placarded.

### b. Non- Liquefied Gas

Non-liquefied gases are also known as compressed gases. At normal temperatures, these gases do not become liquid even at high pressures.

Examples of these gases are oxygen, hydrogen, nitrogen, helium, argon which can be used for fog and welding effects.

c. Dissolved Gas

Acetylene is a common dissolved gas and it happens to be extremely chemically unstable making it an explosive hazard.

**Safety with Compressed and Cryogenic effects:**

- **Always** make sure that permits and your certificate of fitness are current.
- **Never** smoke in the area where compressed and cryogenic gases are being used
- **Always** suspend gas lines if possible (i.e. above doorways) and/or secure lines under cable protectors
- **Never** have gas lines as a possible tripping hazard or close to lighting
- **Never** use natural gas tanks indoors



## **8. Minor Pyro effects, Fire and Flame**

### **Dust and Snow**

#### **a. Dust**

In scenes that require a beach or desert like atmosphere there may be a need for dust or a sand-like substance. Often, vermiculite is used as a sand substitute. This type of product used in enclosed places can be a hazard if it comes in contact with a spark or any other sources of ignition.

#### **b. Snow**

Artificial snow can be made of combustible products such as shredded paper, polypropylene, chemical mixtures, foam or a similar plastic product. It should never be stored, used or handled near flames or other heat/ignition sources although it can be flame-proofed. The MSDS/SDS should always be on hand for any artificial snow product that is used.

Sometimes real snow and crushed ice can be used but not only do the generating machines create high levels of carbon monoxide but it can also be a great hazard to electrical equipment.

Another option for snow that is ideal for large outdoor areas, is the use of **snow candles**. Snow candles are a candle sized tube that can create snow for about 2 minutes by releasing flakes of ash as it is shaken or swung around. The ash created simulates lightly falling snow.

### **Novelty Fireworks**

are defined as ground fireworks that typically produce a weak explosion and sound. It may let off a spark or a whistle. Novelty fireworks are considered non-explosive and limited in their potential to harm people and property but are still considered illegal items in this jurisdiction and require a FDNY permit.

#### **a. Sparklers**

are handheld fireworks that burn slowly. They may give off a colored spark which can be identified by the color of the tip of each rod. This can range from 10 inches to 36 inches in length and can be made with bamboo sticks or metal skewers. Due to the fact that they can reach up to 1800°-3000°F, sparklers should only be used by those with a great understanding of their inherent risk.

#### **b. Poppers/Snaps**

do not have any type of visual effects but serve as a fuseless firecracker that makes a loud pop sound when thrown to the ground.

## **Fire/Flame**

Fire Effects can be used to create atmosphere, a crackling fire place in the background of a scene, a burning garbage can outside of an office building or even as the focal point of a performance such as a person being set on fire.

In New York City the FDNY regulates all fire effects, even things as simple as a lit cigarette in a performance (on stage or in a filmed production).

There have been many developments over the years that make fire effects safer than ever before. It is possible to use flickering lights instead of flame effects. There also have been combustible gels and liquids fuels that are less dangerous than gases, rubber cement and other hazardous and flammable materials.

All fire generating equipment must be properly maintained and all natural gas\* or LPG lines\*\* used must meet all codes and all stationary flame fixtures or holders must be firmly secured.

### **a. Flame Bars**

are used to simulate fire using LPG rated hoses and equipment.



*Flame Bar*

*\*Hardlined gas lines must be installed and approved by a licensed plumber*

*\*\*LPG hoses must have a minimum burst pressure of 250 psi.*

### **b. Sparks**

spark producing devices including grinding wheels, 1.4G pyrotechnic devices including gerbs, comets, mines, and sometimes sparklers.



### **c. Powders**

Even though powder by itself is not flammable, when it is spread in the air it is surrounded by oxygen, allowing for combustion. The powder in the air will ignite and burn explosively (ex: Lycopodium).

*It is also important to note that household powder products such as baking powder/soda, baby powder, cornstarch, dust, coffee creamer and talc (talcum powder) can produce a similar effect.*

### **d. Flash paper**

is a form of nitrocellulose. It burns quickly with a bright flame. It is commonly used for coin and close up magic effects.

### **e. Cigarettes**

And the items used to ignite a cigarette are permissible such as lighters and matches. They should be extinguished in sand, water or an alcohol based gel and not disposed of in garbage until soaked for a reasonable amount of time prior to disposal.

### **f. Candles**

When used as a special effect and the items used to ignite a candle are permissible such as lighters and matches. Candles and their holders must be secured. If the candle will be reused, the excess wax and wick must be cleaned. Candles must always be properly extinguished at the end of the scene. Candles must be soaked for a reasonable amount of time prior to disposal.

## Theatrical Torches

There are many items used as fuel in torch performances:

- Butane
- Camp fuel
- Liquid tiki
- Lantern style(candle)
- Beeswax
- Lamp oil
- Propane
- Alcohol (denatured, isopropyl)

To ignite, the E-27 holder must use a permissible item such as a lighter or a match. Torches must always be held upright with a wrist strap for safety purposes. When extinguishing a torch, using a snuffer or a Kevlar blanket are the safest ways.

## Safety with Minor Pyro and Fire Effects:

- **Always** make sure that all permits and certificate of fitness' are current.
- **Always** inform everyone involved in the production in advance when there will be use of fire and flame effects.
- **Always** discuss the hazards and safety precautions that will be taken while the hazards are in use.
- **Always** conduct a dry-run with all of production including emergency escape routes.
- **Never** allow smoking in the area of any pyrotechnics
- **Always** remove unnecessary personnel from the "danger area."
- **Always** have a minimum of a fire guard present if a pyrotechnician is not available.
- **Always** make sure costumes, and all material in the vicinity of the flame/fire effects are **noncombustible, removed or have been flame-proofed.**
- **Always** maintain adequate ventilation, quickly exhaust excess smoke.
- **Always** make sure that performers close to flames wear proper protective clothing.
- **Always** keep combustible materials at a *safe distance* when using products that require oxygen for combustion.
- **Always** keep hair spray and hair extensions away from fire/flame effects.
- **Never** spray any type of aerosol product in the vicinity of minor pyro, fire/flame effects.
- **Always** properly use a fire extinguisher to help prevent spreading of the fire associated with the fire effect.
- **Never** use water to extinguish a torch.
- **Never** pour any other flammable liquid products in the vicinity of a fire effect.

## **9. Theatrical Firearms (Blank Ammunition)**

Theatrical firearms have been specifically modified for blank fire. The firearm is created to look real in its appearance as well as its function but its only purpose is blank fire.

Blank cartridges may contain gun powder but no bullets. Blanks use paper or plastic wadding in the cartridge to seal in the gunpowder. When blanks are fired, the wadding is propelled from the barrel of the gun and it makes a flash and an explosive sound (to imitate the sound of real gun fire).

Often, there is a false sense of safety when using blank cartridges. Even though they do not contain a real bullet, the amount of force exerted when blank cartridges are fired, especially at close range, can cause severe injury and even death.

### **Safety with Theatrical Firearms**

- **Always** treat firearms as though they are loaded. Blanks can kill.
- **Never** load any firearm until you are ready to use it.
- **Never** point a firearm (loaded or unloaded) at anyone, including yourself
- **Never** interchange blanks. Only use appropriate blanks for the firearm you are handling.
- **Never** engage in “horseplay” with any weapons.
- **Always** wait at least 15 seconds after a misfire before clearing the unfired blank. Keep firearm pointed in a safe direction during the “waiting period” as well as when clearing the unfired blank and loading a new one.
- **Always** clean the firearm after every use. Leaving firearms un-cleaned even for a short period of time can be dangerous and cause serious damage.
- **Always** protect your eyes and ears.
- **Never** leave a firearm unattended.
- **Never** bring live ammunition onto any studio, lot, stage, or location.

## **10. Fire Performances**



Fire performances are possibly the most dangerous acts and potentially injury occurring acts in which the E-27 is responsible. It is also very important to understand and remember that experimenting without experience or guidance can be fatal.

Fire performances involve the control, use and handling of fire. These performances can include fire breathing, fire eating, body burning, fire sticks, juggling, poi, fans, and many other forms of fire manipulation.

#### **a. Fire Breathing**

The performer breathes aspirated fuel from his mouth and into a lit torch creating a breathtaking blast of flames that can reach more than 25 feet in the air.

#### **b. Fire Eating**

The performer places a lit torch into their mouth and then either snuffs the flame or controls the flame by using their fingers, palm, or other body parts to trail or transfer it.

#### **c. Body Burns**

This stunt is one of the most dangerous of all stunts for a movie/television performer. ***This should only be attempted by highly trained professionals who holds an E-18 Certificate of Fitness.*** It has to be done with caution and exactness as the difference of a missed inch or even 3 seconds can be the difference between a safe stunt and life-threatening damage. With body burns, it is *extremely important* that there is an EMS team along with highly trained professionals present.

Body burns can be a partial or full body stunt. A *partial burn* is defined as limited, restricted to a specific part of the body. Whereas a *full burn* takes place over an extensive portion of the performer's body. Breathing apparatus and eye protection are needed for these types of burns.

To perform the stunt of a body burn, first, the area of the performer's body to be burned is covered with a fireproof gel. The fireproof gel (hydrogel) has a cooling effect on the skin and delays the ability for heat to get to the skin. Next, the performer will usually cover themselves with a "long john" type suit that has been soaked in fireproof gel. This "long john" type fire-proof suit is used due to the special fibers it is made of that expand when heated, which shields the skin from burns. A fire suit then will be worn over the "long john" type suit and then the performer's costume. If necessary, a helmet, face shield and mask may be worn to protect the performer's face. Some performers choose to hold their breath, others use a respirator or if



needed, a hidden air tank so that they are able to breathe for the short time that the burn is occurring.

After being all suited up, the performer is then covered in pyrogel which burns at a low temperature but still is visually appealing.

*All of the materials below must be checked regularly and frequently for deterioration of the metal and the wicks attached:*

**d. Fire Stick**

- metal stick with a Kevlar wick

**e. Juggling**

- any object that can be juggled such as (not an all-inclusive list)
  - Fire ball: juggling balls that are either solid balls dipped in fuel (juggled with protective gloves) or balls that are designed with the flame in the center of the ball
  - Staff: metal or wooden tube ranging in length with wicking material on both ends. They are typically used individually, in pairs or sometimes by juggling three or more
  - Torches: made of wood and/or metal with a wick attached at one end. The wick is saturated with a flammable and ignited before use
  - Fire (devil) sticks: are constructed with an aluminum core and have fuel-soaked wicks on the ends to allow them to be set on fire for visual effect.

**f. Poi**

- a pair of roughly arm-length chains with handles attached to one end, and bundle of wicking material on the other

**g. Fans**

- a large metal fan with one or more wicks attached to the edges.

**h. Ropes and Whips**

- jump ropes, floggers, cracking whip, etc...

**Safety with Fire Performances**

- **Never** breathe in with a fire torch or fuel in your mouth, or when you are blowing or breathing fire.
- **Never** blow fire if the wind is too strong and never blow in the direction of the wind at any time.
- **Always** watch out for the audience being too close to the torches and/or performers.
- **Never** use wadding/cotton/old-rag to bind torches as these are flammable.
- **Always** squeegee or spin off all of the excess fuel from the flame tool.
- **Always** Make sure that the torches are secure so that no burning parts are able to fall off.

- **Never** use ordinary/standard rope to bind a torch. It will burn through and untie in the performer's mouth.
- **Always** travel with fuel in a properly "approved" fuel canister marked **"FIRE-EATING FUEL"** so that it is not mistakenly used for anything other than its intended purpose.
- **Never** practice or perform alone. An experienced companion is best. That person should know how to summon help and have some idea of first aid.
- **Always** use safety signals: verbal and physical.
- **Always** have fire extinguishers extremely close.
- **Never** spray a fire extinguisher at a person's face.
- **Always** have an appropriate size and supply of suppression cloth.
- **Always** inspect all materials and articles before use.
- **Always** remove all trip hazard.
- **Never** have additional people around the fire performance. **ONLY** those necessary for the performance.
- **Always** check for hot spots once the fire performance has been extinguished.
- **Always** have a fireguard with an extinguisher in close proximity to the performer and possibly in every possible direction the performer can run.

## 11. Storage

### General Storage

Some general storage ideas to keep in mind with special effects materials, articles and devices:

- They must be stored in a **secured and sprinklered** area with signage that is visible to first responders.
- They must be in properly labeled containers.
- if needed, store in flammable cabinets.
- flammables and combustibles must never be stored together.
- There are specific storage requirements for particular special effects materials, articles and devices.
- Portable "day boxes" can be used for the temporary storage of materials needed for the day. The "day-box" must be under the *personal (direct) supervision* of a COF holder *at all times*.
- Indoor and outdoor storage of propane is **strictly prohibited** unless permitted by the FDNY.
- Storage area must be properly vented.
- In storage area, there should be at least 3 feet between material and electrical equipment.
- Expiration dates on all materials must be checked regularly.

In studios (television/movie), all special effects materials, articles and devices must be stored according to the rules.

### **Outdoor Storage**

- must be located at a distance from any building's HVAC or venting system.
- must not be located close to manholes
- must not cause any trip hazard
- must have proper signage including hazard placards
- must be provided with proper barricades and locks.

### **Truck Storage**

When storing materials on a truck:

- Truck must be parked as close as safely possible to effect.
- Truck must be inspected, properly placarded and stickered by Hazmat Unit and DOT

### **Flash paper Storage**

Stored in a refrigerated environment

### **CO<sub>2</sub> storage**

CO<sub>2</sub> tanks must be:

- properly caged
- properly secured
- in an area equipped with fume sensors
- in an area with explosion proof lighting
- in an area that has the ability to open from the inside

### **Theatrical Ammunition Storage**

Firearms must be stored unloaded and locked in a location separate from the ammunition and away from unauthorized people.

Keep in mind that blanks are still considered explosives and should be stored and treated as such.

### **Propane and Gas Storage**

Propane and gas cylinders used for fire effects must be kept in a storage bunker while in use but must not remain overnight. There should always be someone who is in line of sight of propane effects and has the ability to shut it off. If line of sight is not possible, they must be in constant radio contact.



The FDNY Explosive Unit requires that propane tanks be held inside of these heavy duty bunkers while being stored and used for effects. The bunkers are filled with sandbags and carefully constructed to protect the propane tanks from damage and, in the worst case, direct the force of an accidental explosion or rupture, up and away from surrounding people and property. The bunkers are also fitted with an active

"sniffer" system that will automatically shut down the fuel supply in the event of a leak.

Propane tanks used for special effects must always be stored in an upright position to keep the pressure relief valve in proper functioning order and to prevent leaks.

Empty propane tanks must be stored separately from full propane tanks and in an upside down position.

## **12. Post Discharge Safety**

Areas in which special effects are taking place must be policed, monitored and canvassed to ensure there are no remaining burning embers or debris. Ventilation must be provided until ignition and cleanup have been completed.

Proper equipment such as heat guns, range finders, infrared thermometers, and sniffers are strongly recommended for use on special effects.

Never reuse artificial material that has been used, and swept up as it may have been contaminated with moisture and/or other debris from the floor.

All Special Effects Materials must be properly disposed of according to MSDS/SDS and/or manufacturer's guidelines.

Chemicals used to generate some of these effects are hazardous and it is important to dispose of the waste as directed by the manufacturer and in accordance to local laws and regulations (Department of Environmental Conservation (DEC)).



**Letter of recommendation**

(available in fillable word .doc form by request)

FDNY Fire Prevention  
Attn: Explosives Unit  
9 MetroTech Center RM #3N-2  
Brooklyn, NY 11201  
718-999-1595

To Whom This May Concern:

I am pleased to recommend \_\_\_\_\_ for the Certificate  
of Fitness E- \_\_\_\_\_, \_\_\_\_\_ (S)he has \_\_\_\_\_ years  
of experience with \_\_\_\_\_ working with fire and  
pyrotechnic effects.

(name of individual)

(COF type)

(Certificate of Fitness Title)

(number of years)

(Company name)

\_\_\_\_\_ is of good character and is physically able to perform the  
duties required of a Certificate of Fitness E-\_\_\_\_\_ holder. (S)he is  
experienced in the notification and safety guidelines of FDNY Explosive Unit  
as prescribed by the NYC Fire Code.

(name of individual)

(COF type)

Respectfully,

\_\_\_\_\_  
(Recommender's Signature)

\_\_\_\_\_  
(Print name, Certificate of Fitness #)

**Notary**

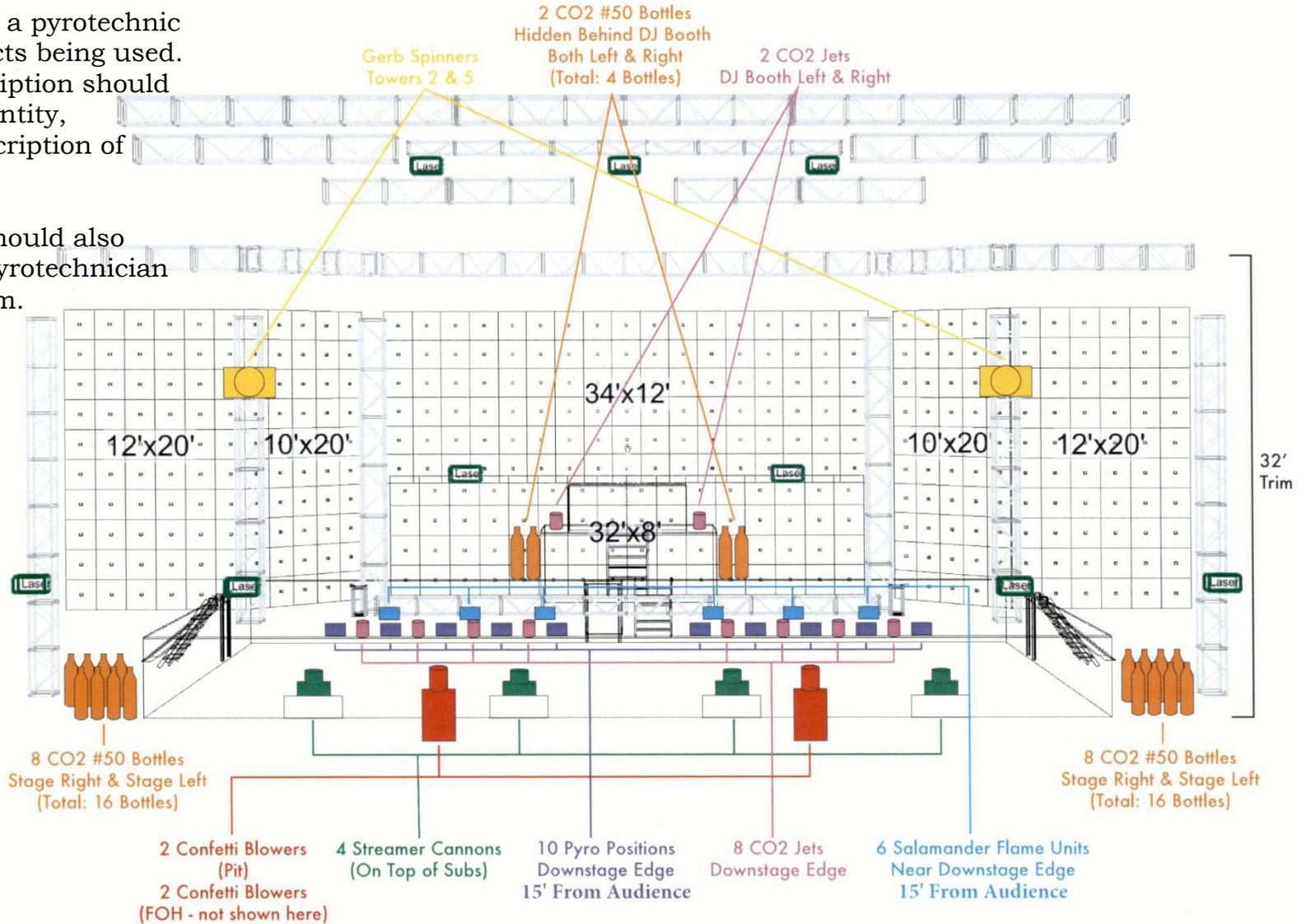
## Sample Site Diagram

(submit with description below)

Site diagrams are required with all special effect permit applications.

The site diagram is a pyrotechnic layout of all products being used. The diagram/description should include brand, quantity, expiration and description of material.

The site diagram should also notate where the pyrotechnician plans to 'shoot' from.



# DESCRIPTIONS

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## **Product List per Show:**

<u>Qty</u>	<u>Description</u>
23	30' Mine - red
10	30' Mine - gold glitter
20	30' Mine - white
12	30' Mine - green
2	30' Mine - amber
2	30' Mine - purple
2	30' Mine - blue
10	30' Mine - blue & white
10	30' Mine - crackle
10	30' Mine - pink
21	1 x 25' Gerbs
11	30' Comet w/ tail - amber
11	Mortar Hit w/ report
33	30 x 10' Gerbs

## **Flame Effects:**

<u>Qty</u>	<u>Description</u>
6	Salamander Flame Units

## **Other Effects:**

<u>Qty</u>	<u>Description</u>
9	Full Color Laser Projection system
10	CO2 Cryo Jet
4	Single Head Confetti Blower
4	Double Barrel Confetti Blower

## 14. Fire Safety and Extinguishers

At least two (2) portable fire extinguishers of the proper classification and size for the hazard present must be readily accessible while special effects, materials and devices are being handled. Often CO2 and water extinguishers are used, but always refer to MSDS for proper extinguisher for product being used.

The Certificate of Fitness (COF) holder or watchperson must be familiar with the different types of fire extinguishers that are present. The COF holder or watchperson must know how to operate the extinguishers in a safe and efficient manner. He/she must know the difference between the various types of fires and the extinguishers appropriate for use in that particular fire. The different classes of fires are described below.

### Classes of Fire Extinguishers

CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL
<b>A</b>	Wood, paper, cloth, trash & other ordinary materials.	
<b>B</b>	Gasoline, oil, paint and other flammable liquids.	
<b>C</b>	May be used on fires involving live electrical equipment without danger to the operator.	
<b>D</b>	Combustible metals and combustible metal alloys.	
<b>K</b>	Cooking media (Vegetable or Animal Oils and Fats)	

A **Multipurpose dry chemical** fire extinguisher may be used to extinguish Class A, B, or C fires.

### Typical Symbols Painted on Fire Extinguishers

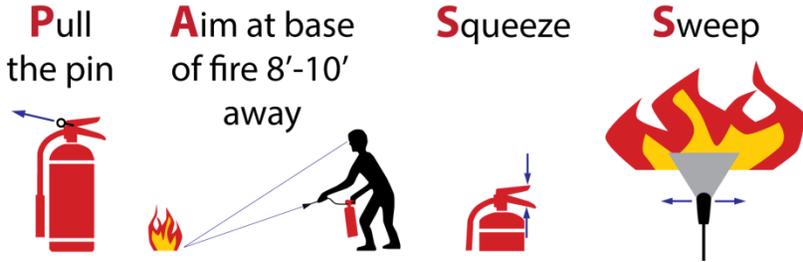
The symbol with the shaded background and the slash indicate when the extinguisher must not be used. Symbols may also be painted on the extinguisher. The symbols indicate what kind of fires the extinguishers may be used on. The COF holder and watch person must understand these symbols. Examples of these symbols are shown below.

			Suitable for Class B and Class C fires but not Class A
			Suitable for Class A fires but not Class B or Class C
			Suitable for Class A and Class B fires but not Class C

Generally, operation instructions are clearly painted on the side of the fire extinguisher. They clearly describe how to use the extinguisher in case of an emergency. An example of these instructions is shown below.

**In case of any fire, 911 must be called.**

Fire extinguishers must be used in accordance with the instructions painted on the side of the extinguisher. They clearly describe how to use the extinguisher in case of an emergency. The Certificate of Fitness holder or watchperson should be familiar with the use of portable fire extinguishers. When it comes to using a fire-extinguisher just remember the acronym P.A.S.S. to help make sure you use it properly. **P.A.S.S. stands for Pull, Aim, Squeeze, Sweep.** An example of these instructions is depicted in the picture below.



**Monthly Inspection**

A monthly inspection is a "quick check" that a portable fire extinguisher is available and will operate. It is intended to give reasonable assurance that the portable fire extinguisher is fully charged and operable.



This is done by verifying that:

- Fire extinguishers are in their assigned place;
- Fire extinguishers are not blocked or hidden;
- Fire Extinguishers have not been actuated or tampered with;
- Fire extinguishers show no visual sign of damage or abuse that prevents its operation;

- Pressure gauge reading or indicator on the fire extinguisher are all in the operable range or position;
- Ensure that the fire extinguishers tags are current;
- Pin and seals are in place;
- Nozzles are free of blockage.
- A basic inspection is a *visual examination* of the portable fire extinguisher.

### **Annual Inspection**

In addition, fire extinguisher maintenance should be performed once per year. It is a “thorough check” of the extinguisher. It is intended to give maximum guarantee that an extinguisher will operate successfully and safely in the event of a fire. It includes a thorough examination, any necessary repair, recharging and/or replacement. This annual inspection must be performed by W-96 Certificate of Fitness holder employed by a FDNY approved portable fire extinguisher company.

### **Notification of unsafe condition**

The person responsible for Minor Pyrotechnic effects should notify their supervisor or site safety manager if an unsafe condition has been created. Any person who becomes aware of a fire, explosion, large spill, leak or any other emergency shall immediately report such emergency to the Fire Department (Call 911). No owner or other person shall issue any directive or take any action to prevent or delay the reporting of a fire or other emergency to the Fire Department. After calling the Fire Department, the supervisor or the site safety manager or other designated person should also be notified.

The Certificate of Fitness holder must know the locations of and how to operate all fire extinguishing devices, control devices, and fire alarm stations installed at the facility. In case of a fire, explosion, or emergency, the Certificate of Fitness (C of F) holder must notify the Fire Department by phone immediately. The Certificate of Fitness holder must know the telephone number of the Fire Department Borough Communication Office. The borough phone numbers are listed as follows. These phone numbers must be posted near the phones most likely to be used in case of an emergency.

Manhattan (212) 999-2222  
 Bronx (718) 999-3333  
 Brooklyn (718) 999-4444  
 Queens (718) 999-5555  
 Staten Island (718) 999-6666

After notification by phone, the local fire alarm must be sounded. In some cases, the activation of the fire alarm will transmit a signal to the Fire Department via a FDNY approved central station company. The C of F holder shall initiate an orderly evacuation when necessary following a hazardous incident, and take reasonable steps to isolate the hazard until the Fire Department arrives. The Certificate of Fitness holder must answer any

questions asked by Firefighters and officers when they arrive. For example, he or she must indicate the location of the fire, describe the type of fire protection devices available, and describe the materials stored on the fire floor. The Bureau of Fire Prevention must be notified as soon as possible after an explosion or fire has occurred. The Bureau of Fire Prevention may require a detailed report on the causes and the consequences of the explosion or fire. Generally, this report must be filed within ten days after the incident.