

FIRE DEPARTMENT • CITY OF NEW YORK



**STUDY MATERIAL FOR THE EXAMINATION FOR
THE CERTIFICATE OF FITNESS FOR
USE AND DISCHARGE OF FIREWORKS**

E-20

ALSO INCLUDED IN THIS BOOKLET YOU WILL FIND THE FOLLOWING:
NOTICE OF EXAMINATION (NOE)

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NOTICE OF EXAMINATION

1. TITLE

Pyrotechnist (**E-20**) - Certificate of Fitness for Use and Discharge of Fireworks.

2. DATE OF TEST

Applicants must make an appointment with the Explosive Unit at 718-999-1595 prior to arriving at 9 Metrotech, Brooklyn, NY 11201. All applicants with appointments must arrive before 8:30 AM for processing.

3. QUALIFICATION REQUIREMENTS

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 identification must be government issued photo identification, such as a State-issued Drivers' License or Non Drivers License or a passport.
4. Applicants must submit **two passport-size photos**.
5. Special requirements for E-20 test:
Applicants must have completed a training course on fireworks displays given by a recognized fireworks company or provide a notarized letter from a registered firework contractor. Proof must be provided before taking the test.
6. Applicants must be **United States citizens**. Proof must be provided before taking the test. The acceptable documents are listed below.

*Acceptable documents for proof of U.S. citizenship: American Passport, Certificate of Naturalization, Certificate of Citizenship, US or US Territory Birth Certificate (US Territories are American Samoa, Guam, Mariana Islands, Marshall Islands, Puerto Rico, Virgin Islands and Wake Island), US DOS Consular Report of Birth Abroad.

4. APPLICATION INFORMATION

Application Fees: \$25 for originals and \$5 for renewals. The fee may be paid by cash, money order, credit card, debit card or personal check made payable to the "New York City Fire Department".

Fingerprint fees: \$75 money order only, payable to "Fire Department City of New York". This fingerprint fee is **ONLY** required for taking your initial test.

The \$25 and \$75 fees must be payable by all applicants prior to taking the C of F test.

5. RENEWAL REQUIREMENTS

You will receive a courtesy notice of renewal 90 days before the expiration date. You will be able to renew your C of F 60 days before the expiration date. It is your responsibility to renew your Certificate. Please be advised that the C

of F will expire in 1 year. It is very important to renew your C of F before it expires.

Please renew **by mail**, not in person at FDNY headquarters. For renewal, send

- (1) either the renewal coupon or a photocopy of your current C of F, and
- (2) two new color passport size photos, and
- (3) a fee of \$5, money order or personal check (do not send cash) payable to
“Fire Department City of New York“ to :
FDNY (Explosive Unit Rm #3N-2)
9 Metro Tech Center,
Brooklyn, NY 11201

Late renewals (90 days after the expiration date, up to 1 year) will incur a \$30 renewal fee. Certificates expired over one year past expiration date will not be renewed. New tests will be required.

FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications.

6. TEST INFORMATION

The E-20 test will consist of **25** multiple-choice questions, administered on a “touch screen” computer monitor. It is a time-limit test. A passing score of at least 70% is required in order to secure a Certificate of Fitness. For additional information and forms please call 718-999-1988.

7. WEBSITE

Please always check for the latest revised booklet at FDNY website before you take the test, the Certificate of Fitness Study Material link, below
http://www.nyc.gov/html/fdny/html/c_of_f/cof_study_materials.shtml

STUDY MATERIAL AND TEST DESCRIPTION

About the booklet

This study material will help you prepare for the written examination for the Certificate of Fitness(**C of F**) for Use and Discharge of Fireworks (Pyrotechnist) (E-20). The study materials include information taken from the New York City Fire Code (FC) Section 3308, New York State Penal Law Article 405, this chapter, the rules, NFPA 1123 and all other applicable laws, rules and regulations. **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 test to qualify for the C of F. A score of 70% correct is required in order to pass the test. All questions have four answer options. Only **one** answer is correct for each question. If you do not answer a 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

1. Which of the following are allowed to be used/displayed 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.

2. 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 can not 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.

PART 1. INTRODUCTION

This study material will help you prepare for the written examination for the Certificate of Fitness for Pyrotechnic Fireworks (E-20). Only FDNY registered contractors are allowed to conduct permitted displays within NYC. As an employee of one of them, this license will allow you to transport, store, handle and use Fireworks shells classed (1.3) and Illuminations classed (1.4).

This Certificate of Fitness does not allow you to possess or use:

- Fireworks for personal use.
- Fireworks shells classed (1.1), considered to be a high explosive.
- Pyrotechnics used Indoors before a proximate audience and or outdoor Stadiums.

This study material includes information taken from the Fire Prevention Code and standard fireworks industry practices. It does not contain all of the information you need to know in order to work safely when using fireworks. It is your responsibility to become familiar with all applicable rules and regulations of the City of New York, even those not covered in this material.

1.1 Inspections and Permits

(FC3308.2)

It is unlawful to store, handle or use any fireworks or pyrotechnic material, article or device without a FDNY permit issued. A FDNY fireworks display permit shall be obtained for each display or other event involving the discharge or other use of fireworks. The fireworks display permit shall incorporate the terms and conditions described on the approved fireworks display application and plan, including the separation distances.

The department shall conduct an inspection of the display site and its surroundings, including the command post, viewing areas, and protected exposures, prior to issuance of a permit and/or prior to the fireworks display.

Firework displays shall be scheduled to commence no later than 9:30 pm unless the variance is issued by the FDNY.

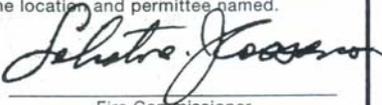
The fireworks display shall comply with the fireworks display permit and the directions of FDNY inspectors. **FDNY may suspend or cancel the display if the display fails to comply with the permit or the inspectors' directions.** The penalties of incompliance may also result in **denial of future applications for such permits, suspension or revocation of the fireworks contractor certificate, suspension or revocation of the E-20 Certificate of Fitness**, etc.

A sample of the permit

D.O. 33	COMPANY HQ	BORO NY	ACCOUNT NO. EXPLOSIVES UNIT	TOTAL FEE \$ Based on display	October 04, 2010
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Expiration Date <u>11/2/2010</u> F 03876 Bureau of Fire Prevention 9 Metro Tech Center Brooklyn, N.Y. 11201-3857 FIRE DEPARTMENT PERMIT Postal Address of Permit Holder or Agent: [New York Corp. 1 North 9th Street New York, NY. 10101 Pyro-Central Corp. reg #C-0050 exp.06-01-XX Occupancy for which this Permit is issued and at which it must be displayed: [Central Park - Cherry Hill Manhattan Manhattan New York OCT 04 2010	PERMIT COVERS CODE NO. DISPLAY: 11-01-10 TIME: 1930 Hrs DURATION: 15 min DISPLAY OF 1,430(1.3G) SHELLS AND 2,000(1.4G) ILLUMINATIONS. MAX SHELL SIZE 6" VARIANCE: NONE DISPLAY TO CONFORM TO NEW YORK CITY FIRE CODE, SEC. 3308 FAA TO BE NOTIFIED AS PER REGULATION 6 HOURS BEFORE DISPLAY AT(877) 487-6867 AND 1 HOUR BEFORE DISPLAY AT(516) 683-2984 RAIN DATE: N/A
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the date and time of the display
Location of display


 Fire Commissioner

The fireworks display permit shall be issued to the sponsor. The permit shall specify the exact location of the display, the date and approximate time of commencement of the display, and such other conditions as the department may prescribe to ensure the safe conduct of the display.

1.2 Supervision and Department Monitoring
(FC 3308.8)

Fireworks shall not be left unattended at the display site, but shall be under the personal supervision of an E-20 Certificate of Fitness holder for fireworks display. Fireworks displays shall be conducted by a company holding a fireworks

contractor certificate, and under the personal supervision of TWO E-20 Certificate of Fitness holders for firework displays and shall be subject to monitoring by the FDNY inspectors.

The FDNY inspectors shall monitor the delivery, unloading, loading, and discharge of fireworks, and post-display site safety measures upon a determination that the presence of such monitoring is in the interest of public safety.

1.2.1 Loading and unloading.

FDNY inspectors must monitor the unloading and loading of fireworks. Only loading or unloading equipment is allowed without FDNY inspectors' presence.

1.2.2 On scene directions.

The fireworks contractor's personnel, the E-20 Certificate of Fitness holders conducting the display, and all other persons at the display site shall comply with the directions of FDNY inspectors. The directions may include any requirement different from or in addition to the fireworks display permit, when, in the judgment of the FDNY inspector, such requirements are necessary to ensure the safe conduct of the display.

1.2.3 Delays and cancellations.

No fireworks display shall commence until approval has been given by the FDNY inspectors on the scene. FDNY inspectors may delay commencement of the display, or suspend or cancel the display, upon a determination that such action is in the interest of public safety, by reason of weather or other site conditions, the use of unapproved equipment or shells, the improper installation or unsafe operation of the display, the presence of any unauthorized person within the discharge site and fallout zone, the failure of any person to comply with the directions of the FDNY inspectors, or other good cause. **In no case shall a display commence or continue when a sustained wind velocity exceeds 30 miles per hour.**

1.2.4 Command post (if required).

The representative of the fireworks contractor overseeing the conduct of the display shall provide a command post from which the fireworks display may be monitored by FDNY inspectors and a representative of the fireworks contractor responsible for the conduct of the display. Such command post shall be located onshore or in an area acceptable to the department that is outside of the discharge site, display site and viewing areas, and that has an unobstructed line of sight to such areas.

1.2.5 Communication.

The representatives of the fireworks contractor overseeing the conduct of the display shall be present at the command post (if the command post is required) prior to the scheduled time of the fireworks discharge, and shall be in radio or telephone or contact with the pyrotechnist crew chief (E-20 certificate of fitness holder) conducting the display, and for offshore displays, the tugboat pilot. Such representative shall relay to such personnel or pilot any directions of FDNY inspectors concerning the fireworks display, including authorization to commence the display. **No fireworks display shall be authorized to commence until such representative is present at the command post or control panel.**

1.3 **Spotter.**

At least one FDNY inspector will be the spotter who will watch the flight and behavior of the shells and provide instructions of any dangerous conditions occurring during the display, such as hazardous debris falling into the audience. The FDNY inspector will be in direct radio or telephone communication with the command post.

PART 2. DEFINITIONS

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.

DISCHARGE SITE. The immediate area surrounding the mortars or other devices discharging fireworks for purposes of an outdoor fireworks display.

DISPLAY SITE. The area in which an outdoor fireworks display is conducted, including the discharge site, the fallout area, and the required separation distance from the discharge site to spectator viewing areas, but excluding spectator viewing areas.

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term “explosive” includes any material determined to be within the scope of Chapter 40 of Title 18 of the United States Codes, and any material classified as an explosive by the hazardous materials regulations of the United States Department of Transportation, as set forth in 49 CFR Section 173.52, except fireworks. Explosives are classified in accordance with the following United States Department of Transportation classification and other terms in common usage:

High explosive. Explosives, including dynamite, that, when detonated, are characterized by a high rate of reaction, high pressure development, and the presence of a detonation wave, and that can be caused to detonate by means of a No. 8 test blasting cap, when unconfined.

Low explosive. Explosives that will burn or deflagrate when ignited, and which are characterized by a rate of reaction that is less than the speed of sound, and low pressure development. Examples of low explosives include black powder, igniter cords, igniters, safety fuses, small arms ammunition and primers, and propellants, 1.3C.

FALLOUT AREA. The area over which aerial shells or other aerial fireworks are fired and intended to combust, deflagrate or detonate, including the area into which debris and unexploded aerial fireworks are expected to fall given the direction and strength of the wind, and the angle or placement of the mortars or other devices discharging fireworks.

FIREWORKS. An article or device that does not present a mass explosion hazard, that is manufactured or used to produce a visible or an audible effect for entertainment or other display purposes by combustion, deflagration or detonation, and that meets the definition of 1.4G fireworks or 1.3G fireworks as set forth herein.

Fireworks, 1.4G. Small fireworks devices, classified as UN 0336 by United States Department of Transportation regulations, containing restricted amounts of pyrotechnic materials designed primarily to produce visible or audible effects by combustion.

Fireworks, 1.3G. Large fireworks devices classified as UN0335 by the United States Department of Transportation regulations, intended for use in fireworks

displays and designed to produce audible or visible effects by combustion, deflagration or detonation, including firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic material, and other display pieces which exceed the limits for classification as 1.4G fireworks.

FIREWORKS CONTRACTOR CERTIFICATE. A written statement issued by the FDNY commissioner to a company authorizing such company to conduct a fireworks display and to be responsible for all storage, handling, use and transportation of fireworks in connection therewith. Without the fireworks contractor certificate, the fireworks company will be prohibited to conduct any fireworks display within NYC, or oversee individuals firing a show and may only be allowed to conduct 1.4 special effects displays.

FIREWORKS DISPLAY. The discharge of fireworks for an outdoors public display.

MINIMUM SECURED RADIUS. A minimum separation distance based on the size of the largest fireworks shell to be used in the display.

MORTAR. A tube or similar device in which fireworks, shells or other aerial fireworks are directed and discharged into the air.

NET EXPLOSIVE WEIGHT (net weight). The weight of an explosive expressed in pounds, representing the aggregate amount of explosives contained within a building or structure, including a magazine, used to establish quantity-distance relationships.

PROTECTED EXPOSURE. Any premises, building, structure, facility, installation, street, railway, natural feature or other thing or place determined by the department to require protection from a fireworks display by reason of its proximity to the discharge site and the fallout area and the risk of resulting harm from aerial or other fireworks.

PROXIMATE AUDIENCE. An audience closer to pyrotechnic devices than permitted 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.

READY BOX. A container with a self-closing cover that is of a material and construction sufficient to protect fireworks from burning debris and from precipitation or other weather conditions. A tarpaulin structure shall not be deemed sufficient for use as a ready box.

SALUTE. Fireworks designed to produce an explosive sound as their primary effect. Aerial Salute is a salute that functions as an aerial shell.

SEPARATION DISTANCE. The distance that is to be maintained during the fireworks display from the outer perimeter of the discharge area to each viewing area or protected area. The separation distance represents the distance determined by the department to be necessary and sufficient to secure viewing

areas and protected areas from hazards associated with a fireworks display, including but not limited to blast, fire, fallout and noise hazards.

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.

SPONSOR. The person that has retained a fireworks contractor to conduct a fireworks display, and to whom the fireworks display permit is issued.

VIEWING AREA. Areas designated for viewing a fireworks display, to which spectators are restricted.

PART 3. ARRANGEMENT, STORAGE AND GENERAL REQUIREMENTS OF FIREWORKS DISPLAYS

Fireworks displays shall be conducted using Division 1.3G, 1.4G, and 1.4S fireworks. The fireworks shall be arranged, located and discharged in a manner that will not endanger any person or damage any property.

Fireworks, 1.3G. Large fireworks devices classified as UN0335 by the United States Department of Transportation regulations, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, deflagration or detonation, including firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic material, and other display pieces which exceed the limits for classification as 1.4G fireworks.

Fireworks, 1.4G. Small fireworks devices, classified as UN 0336 by United States Department of Transportation regulations, containing restricted amounts of pyrotechnic materials designed primarily to produce visible or audible effects by combustion.

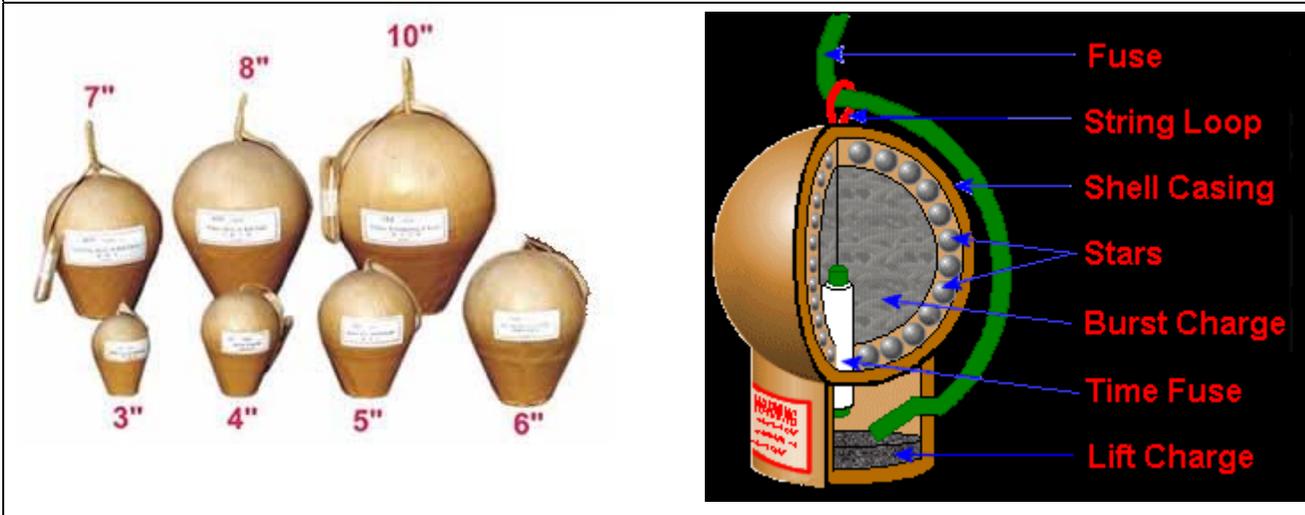
Fireworks, 1.4S. They are special effects fireworks and may be used indoors for theatrical productions, concerts, or other special events. Some special effects fireworks can be labeled 1.4G and classified as "Article, Pyrotechnic" UN0431. These and 1.4S fireworks are not sold to the general public.

There are different types of fireworks. Firecrackers, sparklers, and aerial shells are all examples of fireworks. Firecracker-type fireworks are called salutes. A salute is a device primarily for sound. They may have cylindrical casings and a fuse coming out the end or side. The casing is made of cardboard. They can be filled with many different types of explosives, but flash powder is most commonly used.

When most people think of 'fireworks' an aerial shell probably comes to mind. These are the fireworks that are shot into the sky to explode. There are two types, spherical and cylindrical. They have a main casing with the black powder, stars, and any inserts that may be in it. A second section contains the lift charge. The lift charge is black powder, and is ignited by quick match by an electric match.

In NYC, aerial shells or other aerial fireworks shall not exceed 10 inches in diameter and salute shells shall not exceed 3 inches in diameter or length unless authorized by the fireworks display permit. Such authorization shall only be granted if the applicant can demonstrate to the satisfaction of the department special circumstances warranting the use of such oversize shell and that such shell can safely be discharged within the confines of the display site. No such request shall be considered on the day of the fireworks display.

Aerial shells fireworks



3.1 Clearance Requirements

(FC3308.4)

Viewing areas, parking areas, and dwellings, buildings or structures shall not be located within the display site. The required distances shall be maintained from the display site to the viewing areas and all protected exposures, including the minimum secured radius as set forth in Tables 1, any additional distance necessary to accommodate the fallout area, as calculated by the fireworks contractor and approved by the department, and any protected exposures, or as determined by the department.

For an onshore display or an offshore display, the display site shall be of a size sufficient to allow the applicable minimum secured radius set forth in Table 1.

TABLE 1

ONSHORE DISPLAYS	
Size of Largest Mortar (inches)	Minimum Secured Radius (feet)
<3	300
4	400
5	500
6	600
7	700
8	800
10	1000
OFFSHORE DISPLAYS	
Up to 10	1,000

The minimum secured radius to the property line of any bulk plant or terminal, or facility for combustible, flammable, explosive, or toxic materials, or any institutional occupancy, shall be **twice the distance specified in Table 1**, as applicable, but **in no case less than 1,000 feet**. The commissioner may prescribe a clearance requirement for any other protected exposure.

3.2 Discharge height.

(FC 3308.8.3)

The maximum height of discharge shall be determined by the United States Federal Aviation Administration for each display. **In NYC jurisdiction, no shell shall break at a height greater than 1,200 feet.**

3.3 Incidental Storage at Display Site

(FC 3308.5)

The storage of fireworks at the display site shall comply with the requirements of Fire Code and NFPA 1123. Fireworks may be delivered and stored at the display site **not earlier than 12 hours before the permitted display unless the variance is issued by the FDNY**. Only fireworks to be used for the permitted display may be stored at the display site.

Fireworks shall not be left unattended at the display site, but shall be under the personal supervision of an explosive certificate of fitness holder or other safety personnel who are acceptable by FDNY inspectors.

3.3.1 Preparation of Fireworks.

All fireworks shall be handled carefully while being unloaded from the delivery vehicle, prepared, loaded, or set up. Shells shall be kept in their shipping cartons until they are prepared, loaded, or set up for display. Fireworks shall be stored in weatherproof containers, under a waterproof cover or otherwise kept dry at the display site, prior to the fireworks display. Preparation area(s) shall have only authorized personnel in them at any time display fireworks are being prepared.

3.3.2 Inspection

Shells and other fireworks shall be inspected by the E-20 certificate of fitness holder for fireworks display at the display site.

Any shells having tears, leaks, broken fuses, or signs of having been wet shall be set aside for review by the operator. Any misfired fireworks shells that have been saturated must be treated as hazmat and escorted by FDNY fire apparatus. Repair of fireworks and pyrotechnic articles at the display site shall be limited to repairs that do not require disassembly of the device. If the operator determines that any aerial shells need to be repaired by disassembly of the device, those aerial shells must not be fired and must be either returned to the supplier or disposed of in accordance with the suppliers' instructions or FDNY regulations

after the display. Assembly of fireworks at the display site shall be limited to ground display pieces from finished fireworks or pyrotechnic articles and the attachment of black matches and electric matches to fireworks and pyrotechnic articles.

3.3.3 Ready boxes.

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

Any shells and other fireworks that are not to be used during a fireworks display, including fireworks that are defective or damaged, shall be returned to the truck, properly packaged and the truck shall be placarded or be temporarily stored during the fireworks display in ready boxes located upwind and at least 25 feet from the mortars in the discharge site. If the wind shifts during a display, the ready boxes shall be located to again be upwind from the discharge site.

3.4 Handling.

Aerial shells shall be carried to mortars by the shell body. Shells shall never be held by their fuses except when they are being loaded into mortars. For the purpose of loading mortars, aerial shells shall be held by the thick portion of the fuse and carefully loaded into mortars.

PART 4. DISCHARGE OF FIREWORKS AND POST-DISPLAY ARRANGEMENT, STORAGE AND GENERAL REQUIREMENTS OF FIREWORKS DISPLAYS

4.1 Discharge of fireworks.

(FC 3308.6)

Fireworks displays and any other discharge or use of fireworks **shall be conducted outdoors.**

4.1.1 Mortar placement

(FC 3308.6.1)

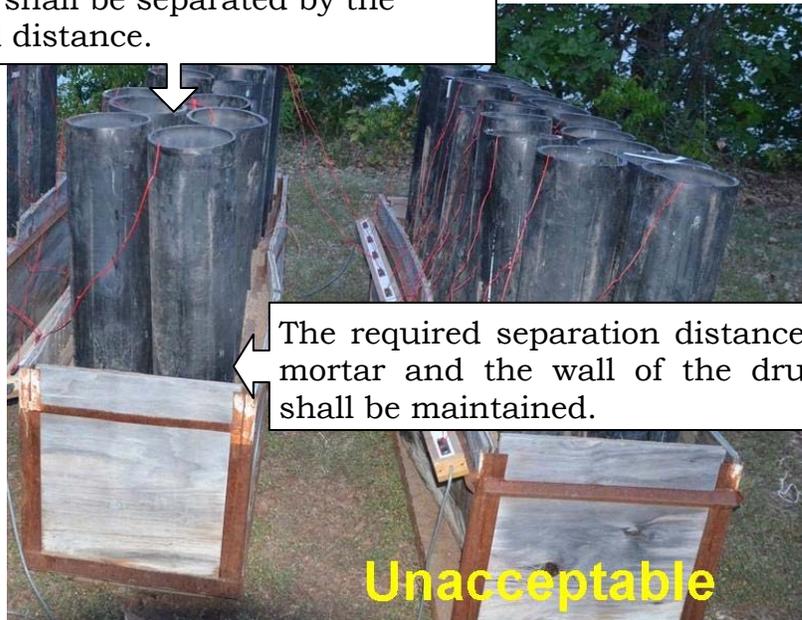
Mortars shall be positioned and discharged as follows:

1. Mortars shall NOT be set up during night hours (between sunset and sunrise) with shells inside. Only the mortars without product are allowed to be set up during night hours.
2. Mortars shall be of sufficient strength and shall be arranged and positioned so that the shells may be safely discharged.
3. Mortars shall be placed in as near a vertical position as possible. Mortars and other devices used to discharge fireworks shall be installed in accordance with NFPA 1123 and shall be positioned such that the shells are projected in a direction that ensures that they combust, deflagrate or detonate above the fallout area and all unexploded fireworks fall into the fallout area. Under no circumstances shall mortars be angled toward the viewing area.



4. Mortars shall be of sufficient length to cause aerial shells to be projected to safe heights.
5. Mortars shall be placed in sand-filled steel drums or heavy plastic drums no less than 32 gallons in capacity. Wood racks or troughs filled with sand may also be used in lieu of drums for firing barrages or finales.
6. Except for mortars placed in wood racks, mortars shall be buried to a depth of between two-thirds to three-quarters of their length.
7. Except for mortars placed in wood racks and as may otherwise be provided in this section, mortars shall be separated from adjacent mortars by a distance of at least 2 inches or the diameter of the larger mortar, whichever is greater.
8. There shall be a separation distance of at least 2 inches or one-half of the diameter of the mortar, whichever is greater, between the mortar and the wall of the drum or trough.

Mortars shall be separated by the required distance.



The required separation distance between the mortar and the wall of the drum or trough shall be maintained.

9. Prior to placement, mortars shall be inspected for defects, such as dents, bent ends, damaged interiors and damaged plugs. Defective mortars shall not be used. Any scale or debris found on the inside surface of the mortars shall be removed prior to placement.
10. Wood racks. Wood racks used in conjunction with firework displays shall be designed and operated as follows: Wood racks shall be of sufficient strength to prevent adjacent mortars from being repositioned in the event that a shell detonates in a mortar, causing the mortar to burst.
 - 10.1. The use of wood racks shall be limited to single break **shells not exceeding 6 inches in diameter**.
 - 10.2. Wood racks with chain fused mortars 3 inches or less in diameter shall be limited to a maximum of 15 mortars per unit. Racks containing mortars 4 inches in diameter shall be limited to a maximum of 12 mortars. Racks containing mortars 5 inches to 6 inches in diameter shall be limited to a maximum of 10 mortars.
 - 10.3. Mortars placed in wood racks **shall not be reloaded** during the display.

4.1.2 Mortar loading. (FC 3308.6.2)

Mortars shall be loaded as follows:

1. Mortars shall be loaded during daylight hours (between sunrise and sunset). Unless sufficient lighting is provided, mortars shall not be loaded during night hours (between sunset and sunrise).

2. All unloading of fireworks from the delivery vehicle and loading and fusing of the fireworks shall be conducted under the supervision of an E-20 certificate of fitness holder in the presence of an FDNY inspector.
3. All shells shall be inspected by an E-20 certificate of fitness holder for fireworks display immediately prior to placement. Any shells that are torn, leaking, show signs of having been wet or have broken fuses shall not be used.
4. The E-20 certificate of fitness holder for fireworks display shall verify that the proper lifting charge has been attached to each shell to ensure the safe control of discharge height.
5. When loading into mortars, shells shall be held by their lowering cords (if provided) or their fuses (if no lowering cord is provided).
6. Shells shall be lowered carefully into the mortar, such that they are properly seated in the bottom of the mortar. Shells shall never be forced into a mortar.
7. No person shall place any part of his or her body over the mortar prior to or during loading.

4.1.3 Control panel for firework displays.

Control panels used to conduct firework displays shall be designed, installed and operated as follows:

1. The control panel and all related equipment shall be located within the display site, at least 50 feet from the discharge site, with a clear line of sight to the discharge site.





A clear line of sight must be maintained from the control panel to the discharge site.

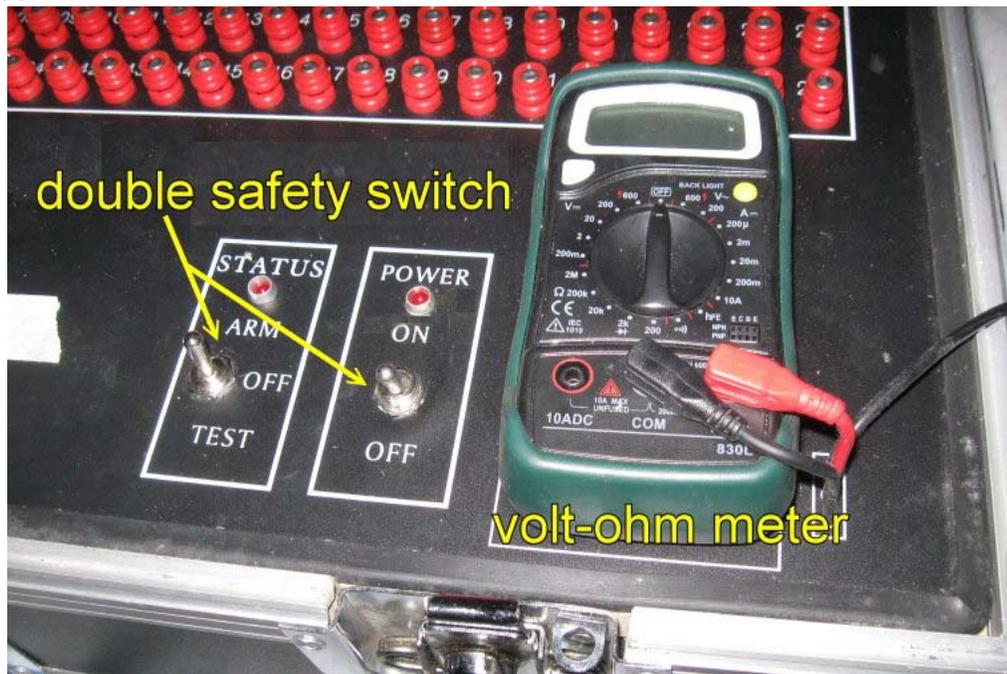
2. A protective barrier capable of withstanding the impact of falling debris or a misfired shell and made of or covered with a fire-retardant material shall be provided between the control panel and the discharge site and above the control panel. Such protective barrier shall be of sufficient size to protect the control panel and all persons who will be positioned at the control panel during the fireworks display, including at least one department representative.



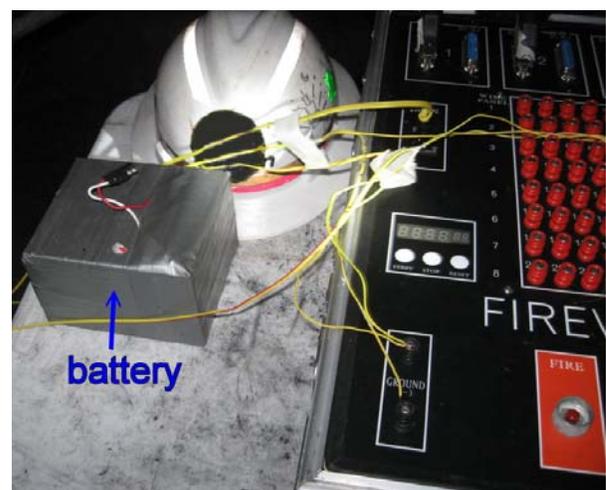
Protective barrier

3. The control panel shall be provided with a double safety switch to prevent premature activation of current to the shells, such as combination of keys or single throw switches connected in series, both of which must be activated for current to flow.

4. Each switch on the control panel, including testing and firing controls, shall be clearly marked to indicate its function. The control panel shall be equipped with an indicator, such as a light, a sound device, or both, to indicate when the control panel is armed for firing.
5. If the control panel has a built-in test circuit, the unit shall be designed to limit the test current to **0.05 ampere** or to **20 percent** of the no-fire current of the electric match being used, **whichever is less**.
6. Multi-testers, such as volt-ohm meters, shall not be used for testing electric matches unless the tester's maximum current delivery potential has been measured to be not more than **0.05 ampere** or **20 percent of the no-fire current of the electric match being used, whichever is less**.



7. Control panels shall be powered by batteries or isolated power supplies used for firing purposes only. If batteries are used, they shall be self-contained in the firing unit or otherwise covered or protected to prevent accidental contact with wires leading to the fireworks. Control panels powered by commercial power may be used, provided that an isolation transformer is used. The transformer shall be located within the firing unit or elsewhere in the firing system.



4.1.4 Ground display set pieces.

(FC 3308.6.4)

Ground display set pieces shall be positioned and discharged in compliance with the following requirements:

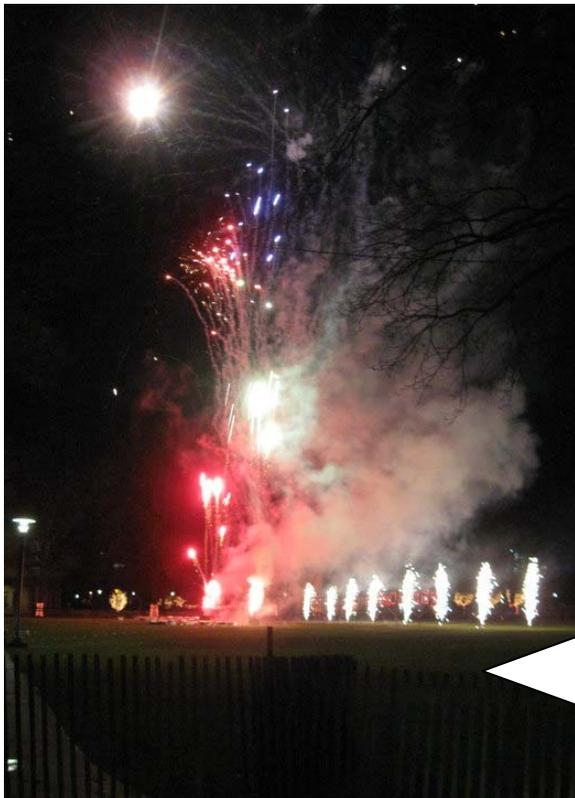
1. Combustible materials located beneath ground display set pieces shall be wet down before the display. Vegetation within 50 feet shall be removed.
2. Poles for ground display set pieces shall be securely placed and braced so that they maintain the proper position when fireworks are displayed.

4.1.5 Fireworks discharge.

(FC 3308.6.5)

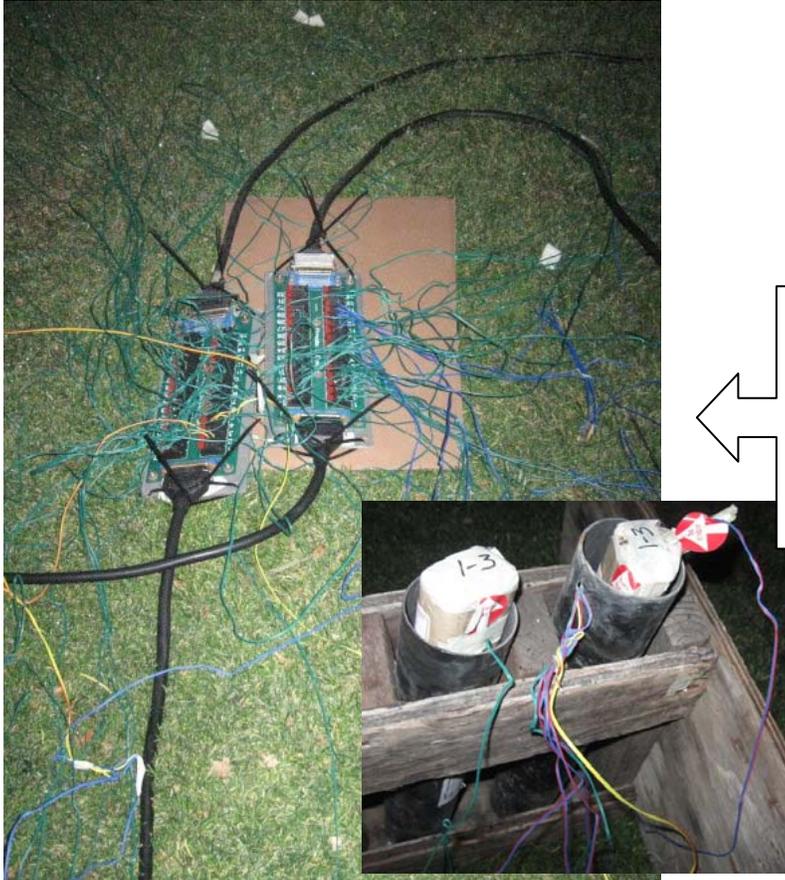
The discharge of fireworks shall be conducted in compliance with the following requirements:

1. All persons conducting the fireworks display shall wear clothing and protective gear in compliance with the requirements of the regulations of the United States Department of Labor, as set forth in 29 CFR Part 1910.
2. Communication shall be maintained at all times between the pyrotech crew chief (E-20) for fireworks display and the command post.
3. No fireworks shall be discharged if any person is at an unsafe distance from the point of discharge. The certificate of fitness holders for firework displays shall ensure that all persons have moved a safe distance away from such mortar or ground display set piece before firing it.



All persons must have moved a safe distance away from the display set piece before firing it.

4. No more than 100 shells may be ignited by a single chain fuse.
5. Control panel operation.
 - 5.1. The control panel and all cables, junctions, and attached electric matches shall be visually inspected immediately prior to the display. The control panel shall not be in “test” status or “arm” status during this inspection.



- 5.2. Racks shall be connected to the control panel and the circuit tested only after all the shells have been loaded into the mortars and all electric matches are connected to the modules. Ground display set pieces shall be connected to the control panel and the circuit tested only after the effects have been loaded onto the display.
- 5.3. **No person shall be in the discharge site when any continuity testing is performed.**
- 5.4. If the testing of the circuits indicates a problem, the crew chief (E-20) for fireworks display shall reinspect any cables, connections, or electric matches and correct the problem. This reinspection shall be performed only after the control panel has been switched off or disconnected from the power source.
- 5.5. Only such fireworks contractor personnel as are necessary for the proper and safe operation of the display and FDNY inspectors shall be allowed at the control panel when fireworks are being discharged.

5.6. No person shall be in the discharge site when fireworks are being discharged. The crew chief (E-20 C of F holder), FDNY inspectors, and the FDNY spotters shall personally visually check the discharge site prior to commencing a display to ensure that the area is clear of all persons, and shall not commence the display, or shall discontinue it, at any time persons are observed within such area. **No hand firing is allowed.**

5.7. The control panel shall be switched off and all cables disconnected after the conclusion of the display verified by FDNY inspectors, prior to any cleanup or other work in the discharge site.

4.1.6 Offshore displays.

(FC 3308.6.6)

Offshore firework displays shall be conducted in compliance with the following requirements:

1. Offshore firework displays shall be conducted from a barge under the control of tugboat maintained at a fixed position, as designated on the firework display permit. No fireworks shall be discharged from any tugboat or other vessel or platform than designated by FDNY permit.
2. Only fireworks to be discharged during the display shall be allowed on the fireworks barges. Storage of excess fireworks on the barges is prohibited.
3. Fireworks to be used in an offshore fireworks display shall be installed, loaded and fused in the presence of FDNY inspectors while the barge is moored at a lawful and safe location in New York City acceptable to the department. The department may authorize such installation, loading and fusing at a mooring outside of New York City at a location acceptable to the department. No installation, loading or fusing shall be conducted on the barge after the barge departs from its mooring. FDNY inspectors shall accompany the barge from its mooring to the display site.
4. The fireworks display barge shall be towed into position by a tugboat authorized to operate in New York City. The tugboat shall be under power at all times during the display, so that all necessary maneuvering of the barge can be effected. The tugboat shall be equipped with an instrument to measure the distance to the shore to enable the tugboat to ascertain and maintain its position. The tugboat shall maintain the barge at least 1000 feet distance from shore. FDNY inspectors shall have access to the wheel house to ensure the distance is kept.
5. Barge design and construction. Barges used in conjunction with firework displays shall be designed, constructed and maintained in compliance with the following requirements:
 - 5.1. **Only steel/steel-concrete barges** acceptable to the United States Coast Guard shall be used as fireworks display barges. Wood barges are prohibited.

- 5.2. Fireworks display barges shall bear durable signs on both sides reading "Fireworks - Stay Clear". The lettering shall be at least 18 inches high in red on a white background.
- 5.3. The control panel shall be located on the fireworks display barge.
- 5.4. Fireworks display barges shall be provided with suitable barriers constructed and arranged so as to protect the control panel, persons at the control panel, and the tugboat from misfired shells, fireworks and falling debris.
- 5.5. Railings or suitable barrier shall be provided around the barges to prevent persons from falling overboard and provide proper protection.
6. All personnel on board the fireworks barge or tugboat shall wear United States Coast Guard approved life preservers (PFD).
7. FDNY inspectors shall be present on the fireworks barge and the tugboat at all times during a fireworks display.
8. Conduct of the display. Offshore firework displays shall be conducted in compliance with the following requirements:
 - 8.1. All fireworks shall be discharged and directed in such a manner that any falling debris, sparks or embers will not land upon the shore, or a wharf, pier, bulkhead or other structure.
 - 8.2. **Reloading of mortars during the display is prohibited.**
 - 8.3. Communication shall be maintained at all times between FDNY inspectors, the tugboat pilot and the command post.
 - 8.4. At least one FDNY inspector assigned to the wheel house will monitor the position of the barge and the trajectory of the fireworks and the fireworks debris. The FDNY inspector may require reposition of the barge or other modifications because of any change in wind direction or other condition is in the interest of public safety.

4.2 Post-display site safety measures

(FC 3308.9)

Immediately upon conclusion of the fireworks display, the control panel shall be switched off and all cables disconnected after the conclusion of the display to be verified by FDNY inspectors at control panel, prior to any cleanup or other work in the discharge site. The FDNY inspectors **shall require a 15-20 minutes cool-down period**. The cool-down period allows slow burning fuses to discharge unfired shells if any. During this period, the fallout zone shall be maintained and no unauthorized personnel shall have access to this area till an all clear is given by the FDNY fireworks crew chief. (Note: records of all unfired shells (sizes) shall be noted on fireworks report.) After the cool-down period, the crew chief (E-20) and the FDNY inspectors shall conduct an inspection of the display site, including a visual check of each mortar or other device used to discharge fireworks, for the purpose of locating unexploded fireworks. This inspection shall be conducted before public access to the site is permitted. Certificate of fitness

holders conducting a nighttime display shall conduct a daylight search of the display site at the next sunrise.



The crew chief (E-20) and the FDNY inspectors shall conduct a visual check of other device or mortars used to discharge fireworks, for the purpose of locating unexploded fireworks.

The crew chief (E-20) or any designated trained individual conducting any fireworks display shall, within 24 hours of the completion of the display, submit to the department a notarized post-display affidavit attesting to the fact that the area was found to be free and clear of any fireworks or other explosive materials or devices. A record of any unfired shells and devices found shall be recorded and forwarded on this record.

4.3 Disposal.
(FC 3308.10)

Any fireworks shells or stars or other effects found in the post-display inspection (cool down period:15-20 minutes) shall be handled pyrotechnician (E-20) only. Packaged in an approved DOT fiberboard box, or if required, placed in bucket and doused in water and allowed to set for at least 5 minutes and then packaged in a DOT approved fiberboard box.

It is important to keep in mind that the soaked fireworks are still considered as hazardous materials and become unstable (as per ATFE). As a result, any amount of product requiring placarding shall require FDNY escorts through the city limits.

PART 5. PORTABLE FIRE EXTINGUISHERS

Minimum two 2.5 gallons pressurized water portable fire extinguisher for every 250 shells must be provided and be readily accessible. During the display, the fire extinguishers must be in close proximity to the responsible personnel.

In case of fire or any emergency situation, FDNY inspectors will determine if additional assistance is required from the field unit. The crew chief (E-20) or pyrotechnicians on scene under the direction of the FDNY crew chief/inspectors and only when deemed safe to do so.

In the event that any fire extinguisher has been found to be damaged or discharged, it shall be replaced or recharged before display. **The crew chief (E-20) and all other E-20 C of F holders and all personnel working on the display should be trained in the use of fire extinguishers.**

Portable fire extinguishers are important in preventing a small fire from growing into a catastrophic fire, however, they are not intended to fight large or spreading fires. **The trained Certificate of Fitness holders should only consider**

extinguishing fires when they are limited in size and spread such that they can readily be extinguished using a portable fire extinguisher.

By the time the fire has spread, fire extinguishers, even if used properly, will not be adequate to extinguish the fire. Such fires should be extinguished by the standby fire company only.



Normally, the operation instruction should be posted on the side of the extinguisher. 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 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.

The Certificate of Fitness holder must be familiar with the different types of fire extinguishers available at the work site. The Certificate of Fitness holder must know how to operate the extinguishers in a safe and efficient manner. The Certificate of Fitness holder must also know the difference between the various types of extinguishers and when they may be used.



There might be some small fires after the fireworks display. The fire(s) should be extinguished with the extinguisher immediately after instructed by the FDNY inspectors.

Class A fires are caused by ordinary combustible materials (such as wood, paper, and cloth). To extinguish a Class A fire, these extinguishers utilize either the heat-absorbing effects of water or the coating effects of certain dry chemicals.

Class B fires are caused by flammable or combustible liquids and gases such as oil, gasoline, etc. To extinguish a Class B fire, the blanketing-smothering effect of oxygen-excluding media such as CO₂, dry chemical or foam is most effective.

Class C fires involve electrical equipment. These fires must be fought with fire extinguishers that do not conduct electricity. Foam and water type extinguishers must not be used to extinguish electrical fires. After shutting off the electrical equipment, extinguishers for Class A or B fires may be used.

Class D fires are caused by ignitable metals, such as magnesium, titanium, and metallic sodium, or metals that are combustible under certain conditions, such as calcium, zinc, and aluminum. Generally, water should not be used to extinguish these fires.

A multi-purpose dry chemical fire extinguisher may be used to extinguish multi-classes fires. Examples of some fire extinguishers are shown below.

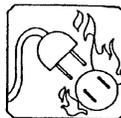
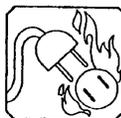
Examples of fire extinguishers



5.1 Typical fire extinguishers

Symbols may also be painted on the extinguisher. The symbols indicate what kind of fires the extinguisher may be used on. Examples of these symbols are shown below. The symbol with the shaded background and the slash indicates when the extinguisher must not be used. The Certificate of Fitness holder must understand these symbols. All fire extinguishers should be kept in good working order at all times.

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

			Class A, B & C Fires Multi-purpose Fire Extinguisher
			Class B & C Fires
			Class A & B Fires
			Class A Fires

Fire Extinguisher Identification Symbols

5.2 Fire extinguisher inspections

The extinguishers are required to be inspected (quick check) monthly. The owner of the fireworks company is responsible to designate a person to perform a monthly inspection. This inspection is a "quick check" that a fire extinguisher is available and will operate.

The quick check should check if

- (1) the fire extinguisher is fully charged;
- (2) it is in its designated place;
- (3) it has not been actuated or tampered with;
- (4) there is no obvious or physical damage or condition to prevent its operation.

The information of the monthly inspection record must include the date the inspection was performed, the person performing the inspection, and those portable fire extinguishers found to require corrective action. At least once per year, all fire extinguishers must be maintained by a FDNY approved company and a W-96 Certificate of Fitness holder.

