

**STUDY MATERIAL FOR THE
CERTIFICATE OF FITNESS
EXAMINATION FOR
EXPLOSIVES LOADER
(E-17)**

NOTICE OF EXAMINATION FOR

Title: Examination for the Certificate of Fitness for Blaster - Tunnels (E-17)

Date of Test: Applicants must arrive before 10:00 AM for processing. Tests are conducted Monday to Friday (except legal holidays) 9:00 A.M. to 2:30 P.M.

QUALIFICATION REQUIREMENTS

1. Applicants must be at least 21 years of age.
2. Applicants must have a reasonable understanding of the English language.
3. 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, character, physical condition, experience, and the address of the site where the applicant will be/is employed. Self-employed applicants must submit a notarized letter.
4. Applicants must present two (2) forms of satisfactory identification i.e., driver's license and passport picture ID.
5. Applicants must present (2) passport-size photographs.
6. An examination is required for renewals of Certificate of Fitness, but may be waived at the discretion of the Fire Commissioner.

APPLICATION INFORMATION

Application Fees: \$25.00 for originals; \$5.00 for renewals. The application fee may be paid in cash, money order, or personal check payable to New York City Fire Department. The \$25.00 fee must be payable by all applicants prior to taking the Certificate of Fitness test. Application forms are available at the Public Certification Unit, 1st floor, 9 MetroTech Center, Brooklyn, NY 11201.

Fingerprint Fees: \$75.00 money order only, made out to **NYS Criminal Justice Services**. This fee is collected upon passing the test.

TEST INFORMATION

Written: The test is of the multiple-choice type. A passing score of at least 70% is Required.

This study material will help you prepare for the written examination for the Certificates of Fitness for Explosives Loader (E-17). This study material includes information taken from the Fire Prevention Code and the Fire Prevention Directives of the Bureau of Fire Prevention, NYFD. The study material does not contain all of the information you need to know in order to work safely when storing, handling, or using explosives. It is your responsibility to become familiar with all applicable rules and regulations of the City of New York, even if they are not covered in this material.

You must pass both a multiple choice test and an oral test to qualify for the Certificate of Fitness. You must pass the multiple choice test before you take the oral test. A passing score of 70% is required in the multiple choice test. All questions on the multiple choice test have four alternative answers. Only one answer is correct for each question. If you do not answer a question your answer will be scored as incorrect. Read each question carefully before marking your answer. You can always come back to "**REVIEW**" your answers. There is no penalty for guessing on the multiple choice test.

Sample Questions

1. All explosives and blasting caps must be stored in:

- (A) the blaster's truck.
- (B) a magazine.
- (C) the site supervisor's shed.
- (D) underground vaults.

The correct answer is "**B**". You would tap alternative "**B**" on your answer computer screen.

2. The word "EXPLOSIVES" painted on the rear of a truck carrying explosives must be painted in which color?

- (A) Black.
- (B) Red.
- (C) Green.
- (D) White.

The correct answer is "**D**". You would tap alternative "**D**" on your answer computer screen.

STORAGE, HANDLING AND USE OF EXPLOSIVES

The key to preventing blasting accidents is to follow proper blasting procedures. Safe blasting practices must be followed at all times, from the moment explosives are delivered to the magazine to the inspection made after the last blast.

There are several kinds of persons who work with explosives. Each one should know and understand what they are permitted to do. A person working with explosives should never attempt something that they have not been trained to do. Every person who works with explosives in N.Y.C. must have an F.D.N.Y. Certificate of Fitness (license). Following is a list of explosives Certificates of Fitness. A person may only perform work with explosives that their level of license allows.

The Blaster is the most highly qualified person at the blasting site, having total responsibility for the use of explosives, record keeping and safety of both workers and the public. The Blaster lays out all shots, supervises explosives loading and setting off the shots. Only the Blaster may give permission to fire a blast.

The Powder Carrier is essentially an apprentice Blaster, assisting the Blaster with loading: (preparing primer cartridges and charges, wiring / hookup, setting off the shots) and paperwork, such as recording quantities of explosives used and shot times.

Explosives loaders help the Blaster and Powder Carrier in transporting explosives to and from the magazines and handling explosives during loading operations.

The Magazine Keeper accepts delivery of explosives at the work site and keeps records as they are received and returned to the magazines or the vendor. The Magazine Keeper is responsible for the safe keeping of explosives in the magazines. They are not permitted to do any other work with explosives.

Explosives Handlers are the drivers of the trucks used to deliver explosives to the blast site. Explosives Handlers are not permitted to do any other work with explosives.

Storage

All explosives must be stored in magazines specially made for that purpose. A magazine must be approved and have a permit to store explosives. Magazines must be under the direct supervision of a magazine keeper holding a Certificate of Fitness. Magazines must be kept locked when explosives or blasting caps are inside. Only the Blaster, Powder Carrier and Magazine Keeper may have keys to the Magazines.

The New York City Fire Dept. requires that accurate records of all explosives taken from , used and returned to the magazines must be kept. These records are kept inside the magazine and must be surrendered to a duly authorized Fire Dept. representative. Both the inside of the magazines and the area surrounding them for 25 feet must be kept clean. Dead Grass, Shrubbery, empty cartons and other combustible materials pose a dangerous fire hazard. Smoking, open flames, matches, lighters etc., are prohibited inside or within 100 feet of a storage magazine. Persons should not be permitted to loiter in the area of the magazines.

Only the amount of explosives estimated for use in the next blast being loaded should be removed from the magazines. Any explosives that are not used for the blast must be returned to the magazines as soon as possible. Explosives taken out or returned, should be carried in their original containers

or special carrying boxes constructed of wood with rope hinged covers.

Blasting Procedures

Explosives at a work site must be under the constant supervision of a Certificate of Fitness holder at all times. Explosives are never to be left unattended at any time. Due to the obvious hazards of explosives, no smoking is permitted under any circumstances whenever handling or working with explosives. There are no exceptions.

When loading explosives, a New York City Fire Department certified Blaster must be present. On a blasting job, the Blaster has total responsibility for safety, ensuring that the powder crew perform only those duties for which they are licensed and that they follow safe procedures at all times. Only authorized persons needed to perform the loading operation should be allowed at the blast site. No part of a loaders body should be placed over the borehole while loading, to prevent injury in the event of a premature detonation.

All Detonators (Caps) are sensitive and should be protected from accidental initiation by heat or impact. Electric caps are also sensitive to stray electricity from radios, cellphones, high voltage power lines, subway electrified rails and electrical storms. When an electrical storm approaches, blasting operations should be suspended and not begin again until the storm has completely left the area. On an electric blasting cap, the shunt covering the bare wires must be left on until hookup. The shunt acts as a safety device preventing electric current from detonating the cap.

To make a primer (a cartridge containing the blasting cap), a hole must be punched that is deeper than the length of the cap when inserted into the cartridge. The primer sets off the rest of the cartridges in the borehole. Primers are made up on an as needed basis. Do not make up primers before loading operations begin due to safety reasons. The primer is generally loaded into the hole first, followed by the other sticks of powder. Never tamp the primer with the loading pole.

The other sticks of powder should be tamped only with a wooden or plastic loading pole. They should be pressed or set into place only with a steady even pressure. Stemming material is then placed in the hole to confine the charges. Stemming material should be relatively clean and free flowing. Large rocks or any combustible materials should not be used for stemming. Sand, crushed stone and tamping bags are usually used. When loading has been finished, all excess explosives must be removed from the blast area and returned to the magazines before hooking up the shot. The wiring / tying in of the shot should be under the control of the Blaster. Only those persons required to complete the tying in of the holes and shot should remain in the blasting area.

Before a blast, the Blaster should position workers with red flags at every approach to the blast site to warn people and keep unauthorized persons away. They may also halt traffic if the job site is located in an urban area.

A shot should be fired as soon as possible after loading is completed. An audible whistle warning signal must be given before each shot is fired. The following signals are used.

One Long whistle
Two whistles
Three short whistles

3 minutes to blast
Ready to blast
All clear

The whistle warning system should be familiar to all personnel working in or near the blasting

area. The warning system should be posted where it can be easily seen. Signs reading " **Blasting No Radio Transmitting** " should also be posted in the area surrounding the job site.

After a blast, workers should not return to the work area until all smoke, fumes and dust have cleared. In tunnel and subway work, the waiting time is sometimes referred to as " smoke time ". The amount of time allowed is usually 20 minutes. This allows the air to safely clear.

Upon returning to the blasting area, special attention should be given to any evidence of misfires, unexploded or burning explosive materials. If any of these situations are observed, all personnel should stay out of the area until it is safe to return as determined by the Blaster. A misfire is the failure of an explosive charge to detonate at the proper time. By following proper procedures and practices, misfires can be prevented in the first place. Any suspected unfired explosives or detonators should be treated as if they were live explosives. A misfired hole may be re-shot by placing a new primer in and refiring. If necessary, extraction of explosives from boreholes should be left to members of the powder crew who are familiar with these operations Under no circumstances would you ever drill into a previously fired hole.

Unless the jobsite has overnight explosives storage, any explosives not used during the day must be returned to the vendor. If any unused explosives cannot be returned at the end of the day, the F.D.N.Y. Explosives Unit must be notified.

Tunnel or subway work

Caps and powder should never be transported together on a shaft cage. They should be separated for safety reasons. It is required for loaders to make two separate trips.

Proper preparation before loading is necessary. Holes, which were previously blasted, must be thoroughly washed out to remove any left over explosives. Under no circumstances would you ever drill into a previously fired hole. Only a specially approved type of loading light is permitted to be used when loading the tunnel face. Electric lights may detonate electric caps prematurely and are prohibited.

After a heading has been loaded, any unused explosives should be returned immediately to the main magazine. The Blaster is the last person to leave the job after the loading is completed and the shot is hooked up. Only the Blaster is permitted to fire the blast. On open cuts, the Blaster may direct an assistant to fire the blast. The blast should be fired only after all preparations have been made and safety precautions taken.

FIRE EXTINGUISHERS

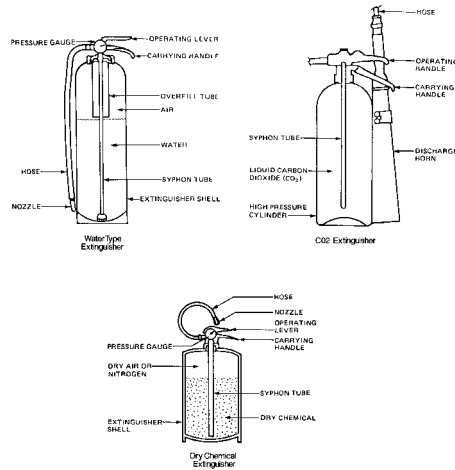
The user of explosives must be familiar with the different types of fire extinguishers that are present. The user must know how to operate the extinguishers in a safe and efficient manner. He/she must know the difference between the various types of extinguishers and when they should be used. The three classes of fires and the right kind of extinguishers are described below.

Class A fires occur when ordinary combustible materials are ignited. For example, wood and paper fires are classified as class A fires. Water type extinguishers should be used to extinguish these fires. The water type extinguishers cool the fire while quenching the flame.

Class B fires occur when flammable liquids or greases are ignited. These fires must be extinguished by smothering the flame. The flame may be smothered using CO₂, dry chemical or foam extinguishers. Water type extinguishers are not effective for class B fires.

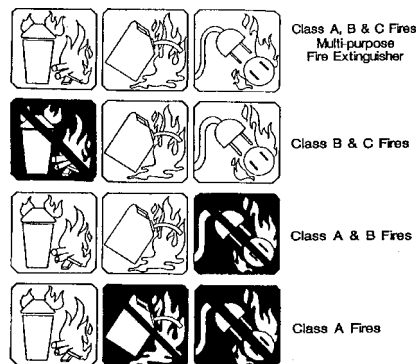
Class C fires occur when electrical equipment catches fire. These fires must be fought with fire extinguishers that do not conduct electricity. CO₂ and dry chemical extinguishers must be used to extinguish electrical fires. Foam and water type extinguishers must not be used to extinguish electrical fires.

Examples of Water type, CO₂ and Dry Chemical extinguishers are shown on the next page.



Typical Fire Extinguishers

Symbols may also be painted on the extinguisher. The symbols indicate what kind of fires the extinguishers may be used on. Examples of these symbols are shown below.



Typical Symbols Painted on Fire Extinguishers

The symbol with the shaded background and the slash indicate that when the extinguisher must not be used. The explosives user must understand these symbols.

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. Examples of these instructions are shown below.



Operation Instructions for a Fire Extinguisher