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FIRE DEPARTMENT • CITY OF NEW YORK



**STUDY MATERIAL FOR THE
CERTIFICATE OF FITNESS EXAMINATION**

E-25

EXPLOSIVES SAFETY CONTROL

EXPLOSIVES SAFETY CONTROL

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NOTICE OF EXAMINATION

TITLE: Examination for the Certificate of Fitness for Explosives Safety Control (E-25)

DATE OF TEST

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

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 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. The sample letters are available at the link below http://www.nyc.gov/html/fdny/html/c_of_f/cof_requirements.shtml or the Public Certification Unit, 1st floor, 9 Metrotech Center, Brooklyn.
5. Applicants must submit **two passport-size photos**.
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.

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.

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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.

TEST INFORMATION

The E-25 test will consist of **20** 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 718-999-1595.

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 for **Explosives Safety Control (E-25)**. This study material includes information taken from the Fire Prevention Code, Rules of the City of New York and the Blaster's Guidelines. **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.

EXPLOSIVES SAFETY CONTROL

I. INTRODUCTION

This study material will help you prepare for the written examination for the Certificate of Fitness for **Explosives Safety Control (E-25)**. This study material includes information taken from the Fire Prevention Code, Rules of the City of New York and the Blaster's Guidelines. 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.

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). Explosives at a work site must be under the constant supervision of a proper Certificate of Fitness holder at all times (e.g. E-10 to E-17). Explosives are never to be left unattended at any time. Due to the obvious hazards of explosives, **no smoking, open flame, hot work, fire arm is permitted under any circumstances whenever handling, working or within a proximity of 100 feet from the explosives.** There are no exceptions.

Any person whose work causes them to be present **within 100 feet** of the storage, handling or use of high explosives must hold the Explosive Safety Control (E-25) Certificate of Fitness (C of F) for blasting job site personnel. (Fire code 3301.5.1.5)

However, the E-25 C of F holders are not allowed to transport, handle or use the explosives in any manner. Only the personnel who possess the proper Certificate of Fitness (as listed below) are allowed to handle, store or use the explosives. **Although E-25 C of F holders are not allowed to touch or be responsible for the handle, storage or use the explosives, they may be in the proximity of the explosive products and need to know and follow the general safety rules from the Blaster crew at the blast site.**

There are several kinds of persons who work with explosives. Each one should know and understand what they are permitted to do. Every person who works with explosives in NYC must have an FDNY 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.

1. The Blaster is the highest qualified person at the blasting site, being in charge 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 possible C of Fs are E-10 (Blaster-all purpose), E-11 (Blaster-shaft and tunnel), E-12 (Blaster-structure demolition), and E-13 (Blaster-underwater).

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2. The Powder Carrier (E-14 C of F) is essentially an apprentice Blaster, assisting the Blaster with loading: preparing primer cartridges and charges, wiring / hookup, setting off the shots and maintaining paperwork, such as recording quantities of explosives used and shot times.

3. The Magazine Keeper (E-15 C of F) 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.

4. Explosives Handlers (E-16 C of F) are the drivers of the trucks used to deliver explosives to the blast site. Explosives handlers are responsible for the safe transport and handling of explosive materials and record keeping pertaining to pick-ups and deliveries. They are not permitted to do any other work with explosives.

5. Explosives Loaders (E-17 C of F) help the Blaster and Powder Carrier in transporting explosives to and from the magazines and handling explosives during loading operations.

Any C of F holder mentioned above (including E-25 C of F holder) who changes with his/her present employer (e.g. change jobs) or who changes his/her home/mail address, who is arrested must immediately notify the FDNY to update the C of F status.

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II. DEFINITIONS

ASSISTANT BLASTER. A person holding a certificate of fitness for blasting assistant who is qualified to supervise explosives storage and handling and blasting operations, sometimes referred to as a powder carrier, and who assists the blaster in performing such duties.

BLAST AREA. The blast site and surrounding area within the influence of flying rock, missiles and concussion.

BLAST SITE. The area in which explosives are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and a distance of 50 feet in all directions.

BLASTER. A person holding a certificate of fitness for blasting operations, who is in charge of and responsible for a blasting operation.

BLASTING CREW. Members of a work force trained and knowledgeable in the safe storage, handling and use of explosives, including assistant blasters, loaders and the magazine keepers.

BLASTING OPERATION. The use of explosives in conjunction with construction or demolition projects or other lawful purposes approved by the commissioner.

DANGER ZONE. The area established by the blaster, including the blast area, to be cleared of all persons prior to discharging explosives.

DETONATING CORD. A flexible cord containing a center core of high explosive designed to initiate other explosives when activated.

DETONATION. An exothermic reaction with explosive effect that utilizes shock compression as the principal heating mechanism and generates a shock wave in the material that establishes and maintains a reaction that progresses through the material at a rate greater than the velocity of sound.

DETONATOR. A device containing any initiating or primary explosive used for initiating detonation that contains no more than 154.32 grains (10 grams) of total explosives by weight, excluding ignition or delay charges. The term includes electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors, and noninstantaneous and delay blasting caps which use detonating cord, shock tube or any other replacement for electric leg wires.

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.

High explosive. Explosives, including dynamite, that, when detonated, are characterized by a high rate of reaction, high pressure development, and the

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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.

JOB SITE. The construction site at which blasting operations are being conducted, including the blast site and blast area.

LOADER. A person holding a certificate of fitness for explosives handling, who handles explosives and performs explosives loading operations.

MAGAZINE. A building, structure or container approved for storage of explosives.

MAGAZINE KEEPER. A person holding a certificate of fitness for explosives storage who is in charge of and responsible for the storage and handling of explosives in an explosives magazine.

MUCKING. The removal, usually by heavy machinery, of debris or other broken material resulting from a blast.

PRIMER. A unit, package or cartridge of explosives, including a detonator or detonator/detonating cord combination, that is used to initiate a main charge of explosives or blasting agents.

THEFT RESISTANT. Construction designed to deter unauthorized entry into magazines or other explosives storage facilities, so as to prevent unauthorized access to stored explosives.

VENDOR. Any person engaged in the transportation and storage of explosives in connection with the sale of such explosives for blasting operations.

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III. SAFETY REQUIREMENTS FOR MAGAZINES

All explosives must be stored in magazines specially made for that purpose. Magazines must be kept **locked** and otherwise secured in the manner prescribed in Fire Code at all times except during delivery or removal of explosives or during inspection or they are empty. **Access to the keys to the magazine shall be restricted to the blasters, the assistant blasters (powder carriers) and the magazine keepers.**

Detonators shall be stored in a separate magazine that does not contain other explosives. As a result, there must be a minimum of two magazines at every jobsite and the magazines storing detonators should be located **100 feet** from magazines storing high explosives.

Both the inside of the magazines and the area surrounding them for 25 feet must be kept. Dead Grass, Shrubbery, empty cartons and other combustible materials pose a dangerous fire hazard. Smoking, burning 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.

III. SAFETY REQUIREMENTS FOR OPERATIONS

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 performs only those duties for which they are licensed and that they follow safe procedures at all times. Only authorized persons should be allowed at the blast site during loading operations.



Signs reading “DANGER-BLASTING AREA – NO RADIO TRANSMITTING” shall be conspicuously posted on the street side of the job site or on the drill boat.

All detonators, caps and lead lines are sensitive and should be protected from accidental initiation by heat or impact. Caps and Powder should never be transported together on a shaft cage and should be separated for safety reasons. All detonators, caps and lead lines are also sensitive to stray electricity from radios, cell phones, high voltage power lines, subway electrified rails and electrical storms. Precautions shall be taken to prevent accidental

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discharge of electric detonators from currents induced by radar and radio station transmitters, adjacent power lines, sub-stations, third rails, dust, lightening and snow storms, or other stray electrical currents. When an electrical storm approaches, blasting operations should be suspended and should not begin again until the storm has completely left the area. No radio transmission with any handie-talkies, CB radios, cell phones (e.g. talking, texting or data transmission) or other devices shall be allowed within **100 feet** of electric detonators. **Even for an emergency situation, cell phones are only allowed to be used at beyond 100 feet away from any explosives or detonators (caps).**

All handling and use of high explosives shall be performed by the Blasting crew (such as the Blaster, the Powder Carrier and the Explosives Loaders). You must take care not to interfere with or distract any member of the Blasting crew from their assigned task, is to safely load and detonate the shot. **All connecting lines are sensitive to flame, impact, pulling, foot traffic etc. Cautions must be exercised while in proximity of the blast site.** Once the shot has been loaded only those persons required to complete the tying in of the holes should remain in the blast area. No blast shall be fired until the blaster has made certain that all excess explosives are in a safe location, all persons and equipment are at a safe distance or under sufficient cover. Once all preparations have been made and safety precautions taken, the shot should be fired as soon as possible after loading is completed. An audible warning signal made by an air whistle, air horn or other similar device shall sound before each shot is fired. All personnel working in or near the blast area shall be familiar with the warning signal system. Signs describing the warning signal system shall be posted at conspicuous locations at the job site, as approved by FDNY. The following audible warning signal system shall be used:

One long signal	<u>Preparing to blast</u> , clear the blast area and danger zone.
Two short signals	<u>Ready to blast</u> , after the blaster checks that the blast area and danger zone are clear.
Three short signals	<u>All clear</u> , after the blaster completes post-blast procedures.

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(Example of the sign for warning signal system)

After a blast, workers must not return to the work area until all smoke, fumes and dust have cleared. In tunnel and subway work, the waiting time is referred to as “smoke time”. The amount of time allowed shall be 20 minutes and with the approval of the Blaster. This allows the air to be cleared.

Upon returning to the blast site, special attention must be given to unexploded or burning explosive materials. Any suspected unfired explosives or detonators should be treated as if they were live explosives. If any of these situations are observed, it should be reported to the Blaster immediately, the Blaster will determine who would be allowed to return to the blast area.

IV. SAFETY PRECAUTIONS

Should you encounter any individual who appears suspicious or does not belong on the blast site, notify the Blaster immediately.

If any event of a fire proximate to any explosives or any explosive fire, vacate the area, and **NEVER FIGHT AN EXPLOSIVES FIRE!**

V. GENERAL SAFETY INFORMATION FOR THE PORTABLE FIRE EXTINGUISHERS



For the small fires not involving any explosives or not proximate to any explosives, portable fire extinguishers are important in preventing a small fire from growing into a catastrophic fire, however, they are not intended to fight large, spreading fires or explosives 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.

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.

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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

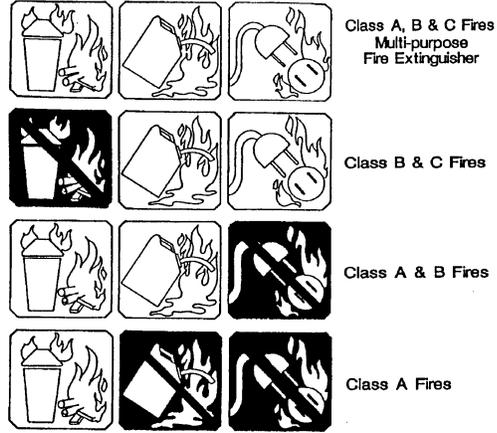
2.5 gallon pressurized water extinguisher	3-A:40-B:C(3A40BC)
	

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.

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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)	



Fire Extinguisher Identification Symbols

Fire extinguisher inspections

The extinguishers are required to be inspected (quick check) monthly. The owner of the 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 and be the proper type;
- (2) it is in its designated place with a proper sign;
- (3) it has not been actuated or tampered with;
- (4) there is no obvious or physical damage or condition to prevent its operation.

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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.

Monthly inspection tag.



It is **unacceptable** without a maintenance tag.