

FIRE DEPARTMENT • CITY OF NEW YORK



**STUDY MATERIAL FOR THE
CERTIFICATE OF FITNESS EXAMINATION G-61
FOR TORCH USE IN MANUFACTURE OF JEWELRY
AND DENTAL LAB OPERATION
(old G-95 and G-39)**

**Note: This G-61 Certificate of Fitness ONLY addresses the TORCH
USE IN MANUFACTURE OF JEWELRY/DENTAL LAB OPERATION. For
OTHER TORCH OPERATIONS, please ask for G-60 Certificate of
Fitness.**

(This new test is available on 07/14/2014)

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NOTICE OF EXAMINATION

Title: **Examination for Certificate of Fitness for Torch Use in Manufacture of Jewelry (G-61)**

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

REQUIREMENTS FOR WRITTEN EXAM

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

1. Applicants must be at least 18 years of age.
2. Applicants must have a reasonable understanding of the English language.
3. Applicant must provide two forms of identifications; at least one identification must be government issued photo identification, such as a State-issued Driver's License or Non Driver's License or a passport.
4. Applicants must present a letter of recommendation from his/her employer. The letter must be on official letterhead, and must state the applicant's full name, experience and the address where the applicant will work. If the applicants are self-employed or the principal of the company, they must submit a notarized letter attesting to their qualifications. For more info: http://www.nyc.gov/html/fdny/html/c_of_f/cof_requirements.shtml
5. Applicants must present a completed application for certificate of fitness (A-20 Form). <http://www.nyc.gov/html/fdny/pdf/a20.pdf>
6. Applicants not currently employed may take the exam without the recommendation letter. If the applicants pass the exam, FDNY will issue a temporary letter with picture for the job seeking purpose. The C of F card will not be issued unless the applicants are employed and provide the recommendation letter from his/her employer.

7. APPLICATION FEE:

Pay the **\$25** application fee in person by o of the following methods:

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

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

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

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

8. EXAM INFORMATION

The **G-61** exam will consist of **25** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limit exam. A passing score of at least 70% is required in order to secure a Certificate of Fitness.

Call (718) 999-1988 for additional information and forms.

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

http://www.nyc.gov/html/fdny/pdf/cof_study_material/g_61_st_mat.pdf

9. If all the requirements are met and pass the exam a certificate will be issued the same day. Applicant who fails the exam will receive a failure report. To retake the exam applicants will need to submit a new application and payment.

RENEWAL REQUIREMENTS

This Certificate of Fitness must be renewed every **THREE YEARS**. The renewal fee is **\$15**. FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications.

You will receive a courtesy notice of renewal 90 days before the expiration date. However, it is your responsibility to renew your Certificate. It is very important to renew your C of F before it expires. Renewals submitted 90 days (up to one year) after the expiration date will incur a \$25 penalty in addition to the renewal fee. Certificates expired over one year past expiration date will not be renewed. New exams will be required.

To change a mailing address:

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

To change a work location,

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

To request a replacement certificate:

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

The certificate can be renewed **On-line, by Mail or in Person**.

• **Renewal online**

If you are an individual, make sure you have your 12 digit Certificate of Fitness Access ID. This can be found on your Renewal Notice. If you do not have your Renewal Notice, your Access ID is your 8 digit Certificate of Fitness number and the last four digits of your social security number. If you are submitting renewals on behalf of a company's employees, the company must be approved by FDNY and have an 8 digit Company Code. To request approval, email pubrenew@fdny.nyc.gov.

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

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

- E-check

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

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

For online renewal go to: <https://paydirect.link2gov.com/FDNYCOF/ItemSearch>

- **Renewal by mail**

Mail your Renewal Notice (if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment

Personal or company check or money order (made payable to the NYC Fire Department)

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

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

and if applicable, supporting documents to:

NYC Fire Department (FDNY)

Cashier's Unit

9 MetroTech Center, 1st Floor

Brooklyn, NY 11201

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

- **Renewal in person**

Submit your Renewal Notice (or if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment by one of the following methods:

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

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

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

and if applicable, your supporting documents to:

NYC Fire Department (FDNY)

Cashier's Unit

9 MetroTech Center, 1st Floor

Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be issued the same day.

A convenience fee of 2.49% will be applied to all credit card payments for original or renewal certificates.

EXAM SITE: FDNY Headquarters, 9 MetroTech Center, Brooklyn, NY. Enter through the Flatbush Avenue entrance (between Myrtle Avenue and Tech Place).



STUDY MATERIAL AND TEST DESCRIPTION

About the Study Material

This study material will help you prepare for the examination for the Certificate of Fitness for **torch use in manufacture of jewelry**. The study material includes information taken from the Fire Prevention Code of the Bureau of Fire Prevention. This study material consists of 4 parts. The exam covers the entire booklet and any tables. **It will not be provided to you during the test. It is critical that you read and understand this booklet to help increase your chance of passing this exam.** The study material does not contain all of the information you need to know to work with a torch. 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 study material. You need to be familiar with the National Fire Protection Association (NFPA) 51B, and Fire Code Chapter 26, and Chapter 35 which regulate the torch use of flammable gases in order to adequately prepare for the exam.

About the Test

25 questions on the Certificate of Fitness examination are of the multiple choice type with four alternative answers to each question. Only one answer is most correct for each question. If you do not answer a question, or if you mark more than one alternative your answer will be scored as incorrect. A score of 70% is required on the examination in order to qualify for the Certificate of Fitness. Read each question carefully before marking your answer. There is no penalty for guessing.

Sample Questions

1. Who was the first President of the United States?

- (A) George Jefferson.
- (B) George Washington
- (C) Bill Clinton.
- (D) Barack H. Obama.

The correct answer is "**B**". You would press "**B**" on your computer terminal.

2. The city in the United States referred to as The Big Apple is:

- (A) Los Angeles.
- (B) Buffalo.
- (C) Florida.
- (D) New York.

The correct answer is "**D**". You would press "**D**" on your computer terminal.

INTRODUCTION

This document outlines New York City Fire Department regulations for torch operations and equipment. Hot work processes are a necessary part of much jewelry factorial work. However, the improper use is often a major cause of fire and it can result in loss of life and property.

Certificate of Fitness

According to the FDNY regulations, a G-61 Certificate of Fitness is needed to conduct an oxygen-fuel torch using any amount of oxygen and flammable gas in jewelry manufacture:

-Exception:

1. Torch operations using oxygen container and **piped natural gas** for jewelry manufacture may be performed by a person without a G-61, but must be under the personal supervision of a G-61 Certificate of Fitness holder. The Certificate of Fitness holder must regulate the pressure and flow of oxygen and natural gas to each torch.

However, if the torch operator for jewelry manufacture involves any oxygen with any fuel gas containers, the operator must be a G-61 holder.

2. Torch operations that use any oxygen or CNG less than 8.7 SCF ALONE or a LPG container less than 16.4 oz ALONE, do not need a Certificate of Fitness.

The Certificate of Fitness holder must keep the Certificates of Fitness upon his or her person or otherwise readily available for inspection by any representative of the Department, at all times while conducting or supervising the material, operation or facility for which the certificate is required.

FDNY Permit

Permits issued by the FDNY are required for any of the following:

- (1) to conduct hot work using oxygen and a flammable gas,
- (2) to store, use or handle any compressed flammable gases (e.g. LPG or CNG or acetylene) in excess of 400 SCF.
- (3) to store, use or handle any compressed oxidizing gas (e.g. oxygen) in excess of 504 SCF.
- (4) to compress a flammable gas to a pressure exceeding 6 psig.

□ Unit Size References: SCF = Standard Cubic Feet

For LPG, 400 SCF is approximately 47 lbs. The following table lists the number of LPG containers for the storage, use, handling or transportation, requiring a permit. This permit will be issued by the Fire Commissioner after the location has been inspected and approved as acceptable for such practices.

LPG Container Capacity	Number of Containers Requiring Permit
14.1 oz	54
16.4 oz	46

Portable LPG containers that are more than **16.4 oz** must not be stored, handled, or used indoors in the following occupancies (as defined in the Building code): residential occupancies, **factory and industrial occupancies**; educational occupancies; institutional occupancies, except as the commissioner may authorize by rule.

For oxygen, one standard size oxygen container (9 in x 55 in) is approximately 250 SCF. In other words, **more than 2 standard size oxygen containers may need a FDNY storage permit.**

Portable **LPG** containers that are more than **16.4 oz** and **CNG** containers with a capacity greater than **8.7 SCF** must NOT stored, handled, or used indoors in the following occupancies (as defined in the Building code): residential occupancies, factory and industrial occupancies; educational occupancies; institutional occupancies, except as the commissioner may authorize by rule.

Any single standard portable LPG container must not exceed 100 lbs in weight. Any single CNG container must not exceed 381 SCF.

A LPG/CNG permit will not be issued by the FDNY for a stationary LPG/CNG installation located in an area where access to piped natural gas from a public utility is available.

CNG may be stored and used for torches used in the manufacture of jewelry ONLY in areas where access to piped natural gas from a public utility is not available, and where the manufacturing activity is lawful use of the premises, as set forth on the Certificate of Occupancy for the premises or otherwise determined by the Department of Buildings. CNG storage and use for such torch operations shall comply with following requirements:

- (A) CNG storage and use shall be limited to a total capacity not exceeding 381 SCF of gas. The Department will not permit CNG storage or use in any one fire area in excess of this maximum capacity, irrespective of the number of manufacturing enterprises separately engaged in such torch operations within that one fire area.
- (B) Storage and use of oxygen containers in connection with such torch operations shall be limited to a total capacity not exceeding 279 SCF. The Department will not permit oxygen storage or use in any one fire area in excess of this maximum capacity, irrespective of the number of manufacturing enterprises separately engaged in such torch operations within that one fire area.
- (C) All CNG storage and use for jewelry torch operations must be under the personnel supervision of a certificate of fitness holder.

(D) All torches using CNG must be listed and labeled by a nationally recognized testing laboratory.

FDNY Site-specific permit authorizes the permit holder to store, handle, or use compressed gases, or conduct a torch operation at a specific premises or location. A site-specific permit is valid for 12 months only. Every permit or renewal shall require an inspection and shall expire after twelve months.

Example of a permanent FDNY permit

FIRE DEPARTMENT, CITY OF NEW YORK				BUREAU OF FIRE PREVENTION			
ACCOUNT NUMBER 7777777	TYPE 10	A.P. S	D.O. 03	ADM. CO. L004	ISSUANCE DATE 01/28/10	PERMIT EXPIRES 01/11	
PREMISES ADDRESS 1111 YORK ST STATEN ISLAND NY 11111				ACCOUNT NAME ASAMOAH INC			
ITEM CODE	SUB CODE	QTY	DESCRIPTION	FLOOR NO.	FEE		
347	00	1	USE O2/COMB GASES IN BLOWPIPE	1	PAID		
PERMIT TYPE 1				ANNUAL FEE		PAID	
1=REGULAR 2=SUPPLEMENTAL 3=DUPLICATE		ASAMOAH INC 1111 YORK ST STATEN ISLAND NY 11111					
 2011012938				BY ORDER OF THE COMMISSIONER			

FDNY permits are not transferable, and any change in occupancy, operation, tenancy or ownership requires that a new permit be issued. The Certificate of Fitness holder is responsible for making sure that all fire safety regulations and procedures are obeyed on the premises. **Permits shall be readily available on the premise for inspection by Fire Department representatives.**

The operation of gas torches is required to comply with the following FDNY code and rule sections:

- Welding and Other Hot Work: **[FC Chapter 26]**
- Flammable Gases: **[FC Chapter 35]**
- Fire Prevention During Welding, Cutting and Other Hot Work: **[NFPA 51B, 2003 edition]**

- Portable Space Heaters Fueled By Piped Natural Gas at Construction Sites **[Rule 1403-01]**
- Piped Natural Gas and Oxygen Consuming Devices and Installations **[Rule 2609-01]**
- Compressed Natural Gas **[Rule 3507-01]**

DEFINITIONS

CNG: Compressed Natural Gas.

HOT WORK: Cutting, welding, thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, cadwelding, installation of torch-applied system, or any other similar operation or activity.

HOT WORK AREA: The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of hot work.

LPG: Liquefied Petroleum Gases.

NFPA: National Fire Protection Association. NFPA develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks.

PERSONAL SUPERVISION: Supervision by the holder of any department certificate who is required to be personally present on the premises, or other proximate location acceptable to the department, while performing the duties for which the certificate is required.

SCF: Standard Cubic Feet.

PART 1. GAS TORCH EQUIPMENT

Gas torches are widely used for different purposes citywide. A fuel gas is used in the equipment to generate a flame to perform heating, cutting welding and brazing. Gas torches utilize two basic types of gas systems: blowtorch (air-fuel) and oxy-fuel.

1.1 Blowtorch (Air-fuel) and Oxy-fuel Torch

1.1.1 Blowtorch (Air-fuel Torch or single tank torch)

To provide enough oxygen for the blowtorch to burn the fuel cleanly, the system mixes in air from the surrounding environment prior to ignition and while the torch is running. A container holds the fuel, while a tube carries it up to the nozzle. A valve near the nozzle lets in the air as needed. Most common fuel gases used in blowtorches are LPG (e.g. butane, propane), natural gas (methane) (either CNG or piped natural gas). However, any LPG container greater than 16.4 oz is prohibited to be used indoor (e.g. stationary work-stations in a jewelry factory).

1.1.2 Oxy-fuel Torch

Oxy-fuel or oxygen-fuel gas torches have two separate containers: a pressurized fuel gas container and a pressurized oxygen container. The oxygen container is made of steel and contains 100% oxygen. A mixture of oxygen and a fuel gas is used to generate a flame. The fuel gas is needed because oxygen does not burn by itself. Oxygen supports combustion and it maintains and controls the flame. In other words, the oxygen intensifies the burning of the fuel gas. For this reason, workers should never use oxygen to blow dirt off their clothes. Even a small spark could immediately ignite the clothing and cause serious injury. Using pure oxygen with the fuel makes the torch flame much hotter than the standard blowtorch torch. For example, Oxy-propane torches can produce about 1,500 degrees Fahrenheit higher than the air-propane torch can generate.

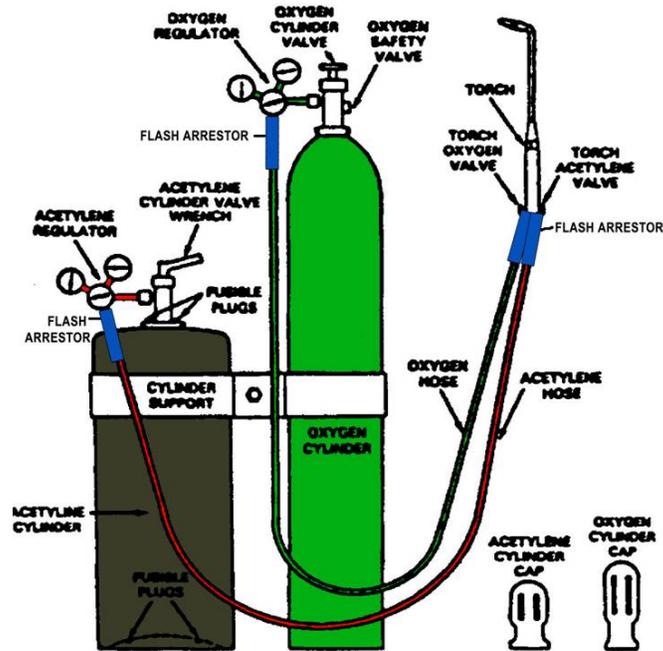
Some of the fuel gases used in oxy-fuel torches are LPG (e.g. butane, propane), natural gas (methane) (either CNG or piped natural gas), and acetylene. Acetylene is used because compared to the other fuel gases it creates the greatest amount of heat when burned (i.e. 3,000 degrees Fahrenheit higher than an air-propane torch).

Both gas containers have control valves on the top of the container. The valves control the discharge of gas from the containers. Gas containers also have a protective cap or protective collar. The protective collar is always located on the top of the LPG container. The caps should be screwed on over the valve when the cylinders are not in use. These caps/collars prevent the valves from being damaged. The oxygen is stored at pressures up to 2200 psi (pounds per square inch). It has a safety disk installed in the control valve connection of the oxygen container. This disk will burst if the oxygen pressure in the cylinder becomes too great. This allows the oxygen to escape into the air and prevents an explosion. The pressure is likely to change if the cylinder becomes hot (e.g. in a fire).

The fuel gas (e.g. propane, natural gas or acetylene) is stored at higher pressures to keep a sufficient amount of fuel available for torch operations. However, it is dangerous to use the fuel gas at pressures above 15 psig, especially for acetylene. For this reason, a regulator is installed on the fuel cylinder. The regulator makes sure that the fuel is discharged from the gas container at a safe pressure range.

The two gases, oxygen and the fuel gases, are mixed inside the torch. The torch operator controls the mixture of the gases by using valves on the torch. Adjusting the valves controls the shape and intensity of the flame. The oxy-fuel mixture is manually ignited by the operator when it leaves the torch.

An example of a typical oxyacetylene welding system is shown below.



A Typical Oxyacetylene Welding System

1.2 Different Use of Gas Torches

1.2.1 Welding and cutting

Welding involves joining two or more pieces of metal together to form a single piece. Molten metal is generated through an intense heat source. Unlike welding processes which join two pieces of metal, cutting processes involve separating or severing a piece of metal through intense heat generated to melt the metal. Both welding and cutting processes often include oxygen and fuel gas. Oxy-acetylene generates the highest temperature which can reach up to 6,000 °F.

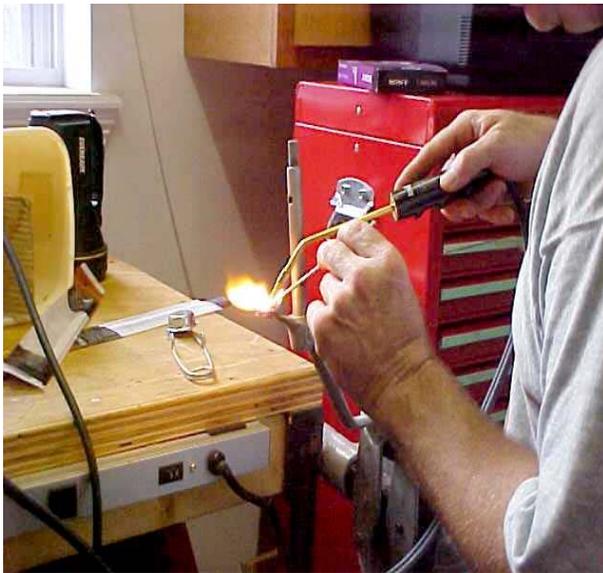


A Cutting Torch



A Welding Torch

1.2.2 Brazing and Soldering



Brazing and soldering are similar to welding in that both the base metal and the filler metals are heated to melting and then solidify to form a joint. However, soldering and brazing temperatures are typically 840 °F. Soldering or brazing typically involves smaller components to be joined and "softer" metals such as lead, tin or silver. Manual soldering processes use a hand-held iron to heat the components to be joined and the filler metals. A propane canister torch is often used for small tin-lead soldering jobs. It is a small disposable container of pressurized propane gas, and the

container is attached with a reusable torch.

Propane/Butane Canister Torch. A small disposable container of pressurized propane/butane gas may be used for soldering. The propane container is attached to a reusable torch. Mostly it comes with two different tips. This arrangement is good for small jobs where limited heating is required.

Bunsen Burner. The Bunsen burner is attached to a gas jet by a length of hose. It often uses natural gas or LPG as a fuel gas. The Bunsen burner is used to control the gas. The gas is ignited as it leaves the Bunsen burner. A small steady flame is produced. The amount of air (or rather oxygen) from the blowpipe mixed with the gas stream affects the completeness of the combustion reaction and manipulate the flame . The blowpipe is controlled by the torch operator.



PART 2. TORCH (HOT WORK) OPERATION

Normally, the gas mixture is manually ignited by the operator when it leaves the torch. The flame itself can reach extremely high temperatures. A high temperature flame is needed to heat the metal. However, usually it is not the flame that causes a fire. Instead, it is the thousands of sparks and pieces of hot metal that are generated when using the torch. The sparks and pieces of hot metal are all possible sources of ignition. In fact, sparks and pieces of hot metal are the source of ignition in about 60% of all fires in industrial occupancies. This number is greatly reduced when the operators are trained to use the equipment correctly.

2.1 Designated Hot Work Area

Work stations must be specific areas designed or approved for hot work. **All torch operations shall be performed at a work station with a surface made of, or covered with, a noncombustible material.** This area must be kept away from any combustible material and combustible waste. Paper, wood shavings, straw and fabric are examples of combustible materials. Some walls, portable partitions, ceilings and floors are also combustible. If possible, the combustible materials should be moved to a safe location. If relocation of the combustible materials is impractical, combustibles, openings or cracks in walls, floors, ducts or shafts close to the hot work area should be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal or fire-retardant guards, or provided with curtains to prevent passage of sparks or slag. Ducts and conveyor systems that might carry sparks to distant combustibles should be shielded, or shut down, or both. Each compressed gas container connected for use shall be secured in an upright position, away from any heat source. The work station area shall be adequately ventilated to prevent the worker from breathing dangerous fumes.



- (1) The Styrofoam cup should be removed.
- (2) The surface of the work station must not be wood and must be covered with non-combustible material (e.g. metal surface).

Smoking shall be prohibited on the premises and **“No Smoking” signs shall be permanently affixed in conspicuous locations throughout the premises.**

2.2 Personal Protection

The gas-torch equipment should only be used by trained and responsible personnel. Only the equipment approved by the Materials and Equipment Acceptance (MEA) should be used. The work area should be well ventilated. This will prevent the worker from breathing dangerous fumes. Exhaust fans may be used to draw the fumes away from the work area. An example of a well ventilated work area is shown below. The workers should wear flame resistant gloves and aprons or goggles, and safety shoes. Clothing with pockets or cuffs should not be worn while working. Sparks or pieces of hot metal might catch in the cuffs or pockets.

Frayed clothing is particularly susceptible to ignition and burning and should NOT be worn when performing hot work.



2.3 Gas Torch Operation Precautions

2.3.1. Restricted areas

Torch operation shall not be conducted in the following areas unless approval has been obtained from the commissioner:

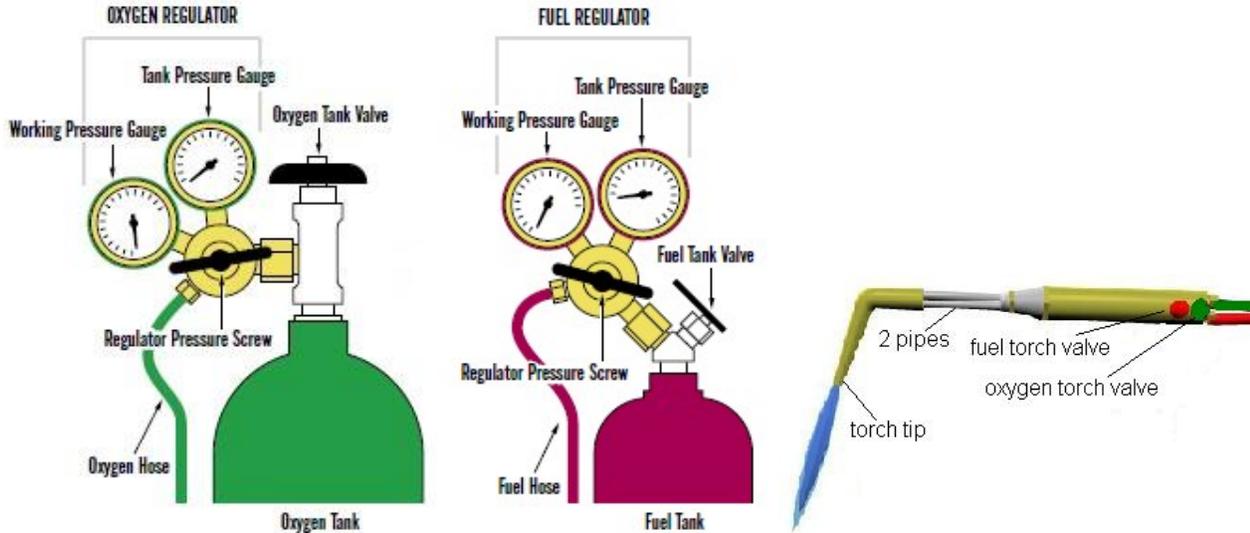
1. Areas where the required sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.



Torch must not be left unattended while ignited.

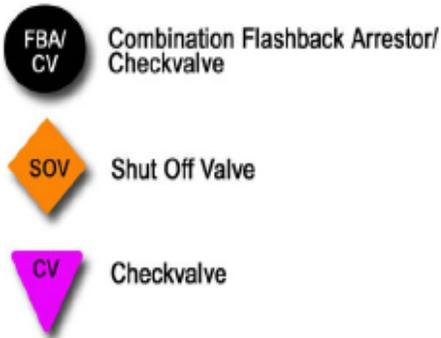
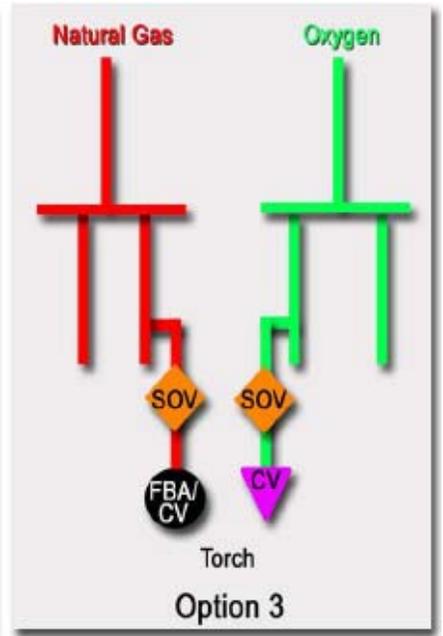
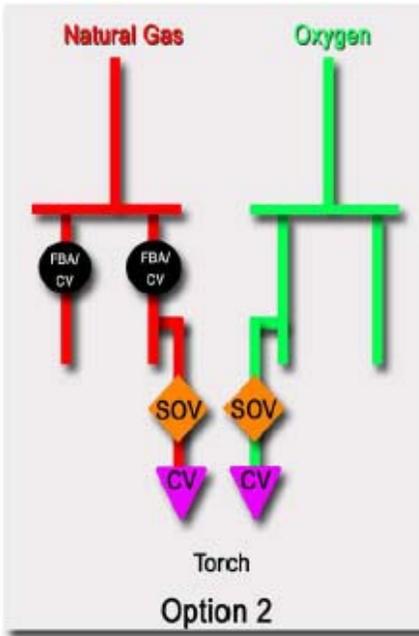
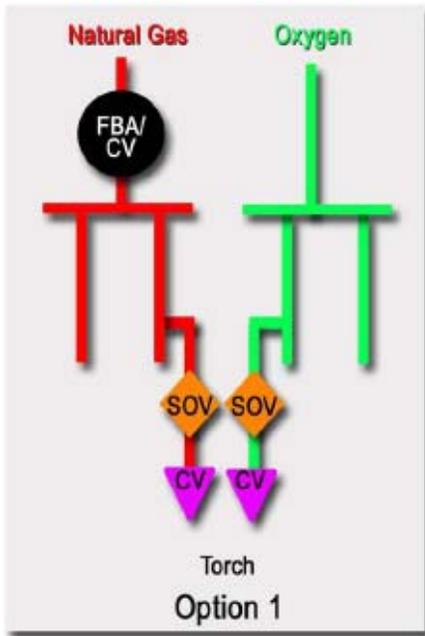
Each person must operate only one torch at a time and such torch must not be left unattended while ignited. The torch equipment should only be used for purposes for which it was intended. It should not be used for any kind of tricks or stunts. This could result in serious or fatal injuries.

2.4 Guidelines for Using an Oxygen-fuel Torch



2.4.1 Set Up an Oxy-Fuel Torch

- Make sure that the valves and the regulators are clean.
- Do not over-tighten the regulator nut as this may damage the fitting.
- Oxygen and fuel gas container valves must be accessible to the torch operator or fire guard for immediate shutoff of the gas supply in the event of an emergency.
- Maintain a safe distance between the hot work area and the gas containers to protect the containers from heat, sparks, slag, or misdirection of the torch flame.
- Check for leaks. If any leaks are found, shut the supply valve, DISCONTINUE USE and contact the supplier/manufacturer and take the system out of service.
- **If CNG is used as torches in the manufacture of jewelry, CNG or oxygen containers must not be manifolded.**
- If the fuel is piped natural gas, required protective flashback arrestor/checkvalve material must be installed as one of the following three options:



NFPA 51 offers three Options for placing the required protective flashback arrestor/check-valve in a manifold pipe system:

- Option 1: Put the flashback arrestor at the head end of the gas supply.
- Option 2: Place flashback arrestors in each branch of the manifold.
- Option 3: Places flashback arrestors at each torch.

Additional checkvalves are required at each torch in Option 1 & 2 and on the oxygen line in Option 3.

Shutoff valves are required on both natural gas and oxygen lines at each torch location.

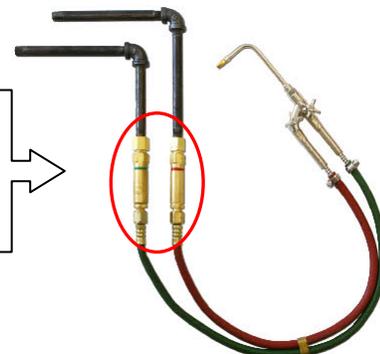
Place the flashback arrester at the head end of the gas supply.



Place the flashback arrester at each torch.



Place flashback arrestors in each branch of the manifold.



2.4.2 Turn On an Oxy-Fuel Torch

- Open the gas container valve slowly and allow pressure to stabilize. The acetylene container valve should be opened by only 1/4 turn. The acetylene pressure should never be above 15 psig. If more acetylene is needed to supply, the larger torch hose should be used.
- Open the fuel torch valve a very small amount and light with a spark lighter.
- Once the flame is lit, open the fuel valve more and open the oxygen torch valve until the desired flame composition is achieved.

2.4.3 Turn Off an Oxy-Fuel Torch

- If the torch operation is to be discontinued for **a period of 1 hour or more**, the torch valve must be closed and the gas supply to the torch also must be completely shut.
- **Oxygen and fuel gas container valves must be accessible to the torch operator for immediate shutoff of the gas supply in the event of an emergency.**
- Turn off the gas torch valves. Some manufacturers suggest turning off the oxygen side first to prevent soot from building up inside the torch tip. But some may suggest first turn off the fuel gas torch valve. Then turn off the oxygen. **It is always best to follow the instructions for the torch you are using.**
- Close both the oxygen and fuel container valves completely.
- Open the torch valves, one at a time, to bleed the hoses. The pressure shown on both pressure gauges should drop to zero. Close the torch valves. Turn both regulator pressure screws counter-clockwise until they are loose.
- Disconnect the regulators from the gas containers or disconnect the hoses from the regulators.

2.4.4 Special Precautions for Using Oxy-fuel Equipment

(1) Avoid oil or grease

Containers, valves, regulators, hose and other apparatus and fittings for **oxygen must kept free of oil or grease**. Oxygen containers, regulators must not be handled with oily hands, oily gloves, or greasy tools or equipment. The oil and grease are more likely to ignite in the presence of oxygen. This is because the oxygen intensifies the burning of other materials. The mixture of pressurized oxygen and oil or grease may also cause an explosion.

(2) Never mix gases inside a container

Never attempt to mix oxygen and fuel inside a container. Never attempt to transfer oxygen or acetylene from one gas container to another.

2.5 General Guidelines for Using a Blowtorch

2.5.1 Set Up a Blowtorch

- Make sure that the valves and the regulators are clean.
- Do not over-tighten the regulator nut as this may damage the fitting.
- The fuel gas container valve must be accessible to the torch operator or fire guard for immediate shutoff of the gas supply in the event of an emergency.
- Maintain a safe distance between the hot work area and the gas containers to protect the containers from heat, sparks, slag, or misdirection of the torch flame.
- Check for leaks. If any leaks are found, shut the supply valve, DISCONTINUE USE and contact the supplier/manufacturer and take the system out of service.

2.5.2 Turn On a Blowtorch

- Open the gas container valve slowly and allow pressure to stabilize.
- Open the fuel torch valve a very small amount and light with a spark lighter.
- Torch should be ignited by friction devices or other approved methods, should not use matches or other hot works. Use the torch valve to control the size and heat of flame.

2.5.3 Turn Off a Blowtorch

- If the torch operation is to be discontinued for **a period of 1 hour or more**, the torch valve must be closed and the gas supply to the torch also must be completely shut.
- The torch system must be shut down as follows:
 - a. Close gas container valve.
 - b. Open torch valve and drain regulator and lines. DO NOT discharge toward people, flame or source of ignition.
 - c. Release regulator adjusting knob fully counterclockwise.
 - d. Shut off torch valve. Disconnect torch and regulator, replace the protective cap and plug to the hose end and supply tank respectively for overnight or longer shutdown.

2.6 Common Problems Occur With Torch Operations

2.6.1 Backfire

This occurs when the flame on the torch goes out unexpectedly. A loud snap or pop may occur when the flame goes out. Sometimes the flame will quickly relight. This happens when the working surface area is hot enough to re-ignite the flame.

Backfire may be caused by several things that are easy to fix. The following is a list of some conditions that might cause backfire.

- (1) Touching the nozzle tip against the working surface.
- (2) Overheating the nozzle tip.
- (3) The oxygen and/or the fuel gas is set at the wrong pressure.
- (4) The cutting or welding tip is loose or dirty.
- (5) Dirt on the work surface.
- (6) Kinks or blockages in the hoses.
- (7) The nozzle tip is damaged and not seated properly in the torch head.

If backfire is noticed the container valves should be closed and the equipment checked for the symptoms listed above. If any dirt or damage is noticed, it should be cleaned or repaired before the equipment is used again.

2.6.2 Flashback

This occurs when the cutting or welding flame burns inside the torch or the hoses. It is usually accompanied by a whistling or hissing noise. As soon as the hissing or whistling is noticed the torch control valves should be closed. Then the fuel gas container valve should be closed. This allows the flame to burn itself out. After a few minutes the fire should have burned itself out.

Flashback indicates that there is something seriously wrong with the equipment. The equipment should be checked for damage or blockage. Check for the same conditions that might cause backfire. A build up of dirt may also cause the flashback. This can be a very dangerous situation. Care should be taken to make sure that it is fixed properly. If the equipment is not cleaned and repaired correctly it may result in an explosion. The entire system should be cleaned and repaired if needed. If the flashback happens again, a qualified technician should repair the equipment.

2.6.3 Check for Leaks

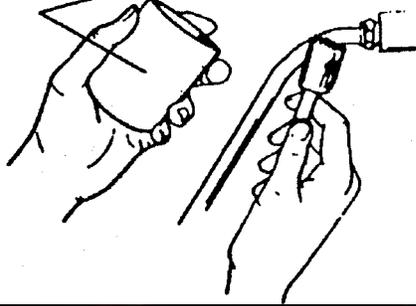
The gas containers, valves, hoses, and related equipment should be inspected for physical damage. Special care should be taken to identify any defects that may cause a leak. **Any defective components that are discovered must be marked and be replaced before the equipment may be used again.** If any leak of flammable gases or oxygen is detected, move the gas container to an isolated, well-ventilated area away from combustible materials. Post signs that describe the hazard. The **Certificate of Fitness holder must not attempt to do any repairs, but only take the equipment out of service.** This equipment is very sensitive and must be repaired by the manufacturer only.

After the new container has been connected to the appliance, all connections must be checked for leaks. Most of these leaks occur at the top of the gas container in areas such as the valve threads, pressure safety device, valve stem and valve outlet.

These areas must be checked using a soap and water solution. **NEVER CHECK FOR LEAKS WITH A FLAME.** First make sure that all connections are tight. Then open the container valve. Each connection is checked by brushing or spraying a

soap and water mixture on the connection. The connection should be checked to see if any air bubbles are present. If no air bubbles are visible there is no leak. However, if bubbles are present there may be a problem with the connection. The suspected fittings should be disconnected and cleaned. Then the connection is tightened and the checking procedure is repeated. If the bubbles are still visible, there is a problem with the connection. The fittings should be repaired or replaced before the equipment is used again. **A lighted flame (for example, a match) should never be used when checking a connection for a leak.**

Soap and Water Solution



Occasionally, ice or moisture may build up on the regulator. Icy build-up indicates that the compressed gas is leaving the gas container in a liquid state. This is caused by a dangerous defect in the gas container. If ice build-up on appliance or connectors, shut off the main control valve of the fuel container, take it out of service, and return it to the supplier immediately. If the ice build-up is on the gas container itself or its control valve, you should call 911 immediately.

PART 3. COMPRESSED GAS CONTAINER

The gases used by gas torches are commonly supplied in compressed gas containers, which can pose additional handling and transport hazards. All compressed gases are potential hazards because of the pressure within the container, their flammability, and/or their toxicity. The chemical is in gaseous form and pressurized, it can quickly contaminate a large area in the event of a leak.

3.1 Handling, Use, and Storage of Compressed Gas

3.1.1 General Guidance

(1) Label all compressed gas containers clearly

The contents of any compressed gas container must be clearly identified. Gas identification should be stenciled or stamped on the container or a label, and is typically applied near the neck of the container. **Do not rely solely on the color of the container to identify the contents. Do not use any container that is unmarked or has conflicting marking or labels.**

(2) Do not refill container

The gas containers must be replaced when they are empty. It is illegal to refill gas containers in New York City. **Empty containers must be handled in the same manner as full ones.** They should be marked empty, the container valve or regulator tap must be closed and stored separately from full containers. All empty containers must be promptly removed by vendors.

(3) Upright position

The oxygen and the fuel gas containers should be maintained in an upright position when being used. This is true for both the portable and the manifold system. This is especially important for the acetylene containers. If the acetylene container is used while on its side the acetone may escape. This may result in an explosion inside the gas container. The gas containers used for a portable oxy-fuel torch system are usually secured on a handtruck. The containers are less likely to be damaged when secured to a handtruck. The handtruck permits the gas containers to be moved safely. The portable system is usually used for on-site jobs. All gas containers must be secured from tipping over, and should be stored in an upright position, and be equipped with a pressure regulator designed for the specific gas and marked for its maximum container pressure. You can use appropriate material, such as chain, plastic coated wire cable, commercial straps, etc., to secure gas containers.

(4) Well-ventilated areas

Indoor compressed gas storage and compressed gas use areas must be located in well-ventilation areas. LPG containers shall not be used in a cellar, basement, pit or other area below grade where heavier-than-air gas might collect. LPG containers shall not be used in an above-grade underfloor space or basement unless such location is provided with an approved means of ventilation.

Exceptions: Portable LPG containers are allowed to be used to supply approved self-contained torch assemblies. Such containers shall not exceed 16.4 ounces of LPG.

(5) Always replace the protective cap

Most gas containers have a protective cap. These devices protect the container control valve from physical damage. The protective cap is shaped like an inverted cup. It is screwed on top of the gas container. It must be in place when the gas container is not in use.

(6) Away from Temperature and Physical Damage

All gas containers and the related equipment must be protected from extreme temperature and physical damage. For example, gas containers for temporary stationary service must be placed on firm and non-combustible foundation. High temperatures (e.g. above 125 °F) can cause the pressure inside the container to increase to a dangerous level. A protective partition must be used to shield the containers that are exposed to hot air blown by a heating appliance. **All containers must be secured in an upright position and must not be stacked or stored on shelves.**

(7) Regular Inspection

The Certificate of Fitness holder must regularly inspect the compressed gas containers, connections, and appliances for leaks. The damaged containers must be removed from services, repaired and tested by an authorized person.

Quick visual check of compressed gas containers:

- No extreme denting, gouging, or corrosion is on the compressed gas container.
- The container protective cap/collar and the foot ring are intact and are firmly attached.
- The container is painted or coated to minimize corrosion.
- The container pressure relief valve indicates no visible damage, corrosion of operating components, or obstructions.
- There is no leakage from the compressed gas container.
- The container is installed on a firm foundation and is not in contact with the soil.

3.1.2 Prohibitions for LPG and CNG

Description	LPG	Exception	CNG	Exception
Store, handle or use it in a basement, cellar or other below grade area	Prohibited	Emergency indoor Repairs (except in an occupied place of public assembly), manhole operation	Prohibited	Emergency indoor Repairs (except in an occupied place of public assembly), manhole operation
Store, handle or use it in, or bring it or allow it into, any residential occupancy, or on any lot containing a building used for a residential occupancy, or any non-residential building	Prohibited for any LPG container with a capacity greater than 16.4 ounces	Emergency indoor Repairs (except in an occupied place of public assembly)	Prohibited for any CNG container with a capacity greater than 8.7 SCF	Emergency indoor Repairs (except in an occupied place of public assembly)
Store the containers on the roof of any building	Prohibited		Prohibited	
Handle or use it on the roof of any building	Prohibited for any LPG containers with a capacity greater than 16.4 ounces.	Emergency indoor Repairs (except in an occupied place of public assembly)/Asphalt melter	Prohibited for any CNG containers with a capacity greater than 8.7 SCF	Emergency indoor Repairs (except in an occupied place of public assembly)/Asphalt melter.
Store, handle or use it in or on motor vehicles	Prohibited	Temporary storage incidental to transportation, or as a fuel for generating motive power for a motor vehicle	Prohibited	Temporary storage incidental to transportation, or as a fuel for generating motive power for a motor vehicle
Store, handle or use it for a stationary installation in any area where access to pipel natural gas from a public utility is available, except as authorized	Prohibited		Prohibited	

by the commissioner.				
Store, handle or use it for space heating or water heating	Prohibited	Residentially occupied moored vessels	Prohibited	Residentially occupied moored vessels
Use non-metallic pipe , tubing and components	Prohibited	Construction sites, emergency indoor repairs, manhole operations	Prohibited	Construction sites, emergency indoor repairs, manhole operations
Dispense LPG/CNG, fill a container with LPG/CNG, or transfer LPG/CNG from one container to another	Prohibited		Prohibited	Fill the permanently mounted CNG containers on CNG-powered vehicles

3.1.3 Related Equipment

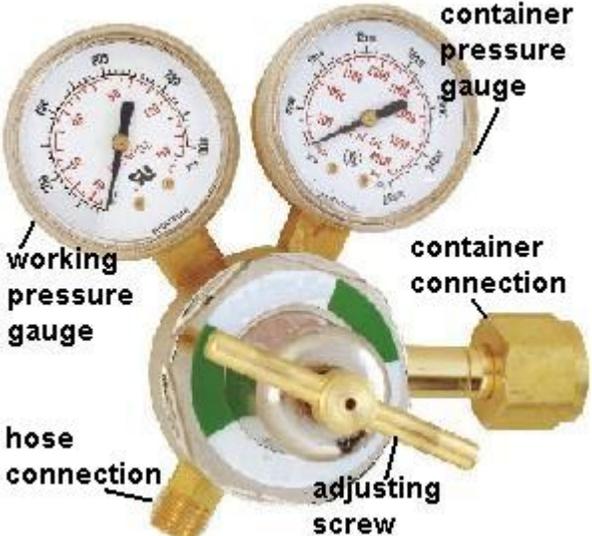
(1) Control valve

A control valve is on the top of each gas container. This valve can be opened or closed to control the discharge of the contents of the gas container. A handle is simply turned to open most gas control valve. **The control valve must be opened by hand.** A special key is needed to open the acetylene control valve. Adjusting the valves controls the shape and intensity of the flame. **Acetylene valves shall not be opened more than 1 1/2 turns.** Container valves shall be closed before moving a gas container, when the torch is not in use, and when the gas container is empty.

(2) Regulator

Before the gas containers can be used, a regulator must be attached to each of the control valves. A regulator is one of the most important parts of a compressed gas system. The purpose of the regulator is to control the flow of gas and lower the pressure from the container to the appliance. The regulator not only acts as a control regarding the flow and distribution of gas, but also as a safety barrier between the high pressure of the gas container and the end use appliance.

Always select the regulators recommended by the manufacturer. Do not interchange regulators between different sizes/types of container without consulting the manufacture. **Do not open the gas container valve or regulator tap until the regulator is securely attached.** Regulator connections to gas container valves must be completely free of dirt, dust, oil, and grease. The regulator controls the discharge rate of gas from the container. Examples of typical regulators are shown below.

A Typical Regulator of CNG Container	A Typical Regulator of Oxygen Container
	

(3) Hose, Piping and Tubing

Where fixed piping is used to pipe CNG or oxygen to the work station, such piping shall be made of either copper or steel. All new and repaired CNG piping must be

tested at 1½ times normal working pressure but not less than 3 psi gauge using air or inert gas. There must be no drop in the shut-in pressure for a period of 30 minutes. Piping previously installed in the building for natural gas use shall not be used for CNG or oxygen for such torch operations. The installation of piping must be in accordance with the requirements of Fire Department. Hose must be securely connected to the appliance. Only DOT approved hoses designed for a working pressure of 350 psi are allowed. Hoses that are worn or damaged, including those with burn marks, must be replaced. Generally speaking, nonmetallic pipe, tubing and components for any installation, appliance or equipment using CNG is prohibited. However, nonmetallic hose may be used for such torch operations where the task does not allow use of stationary CNG devices or equipment, necessitating a flexible connection between the device or equipment and the CNG container, provided that: (1) the length of the hose does not exceed 6 feet; (2) The hose is fabricated of materials that are designed for use with CNG, if for CNG connections, and of materials that are designed for use with oxygen, if for oxygen connections; and (3) The hose is color-coded **red**, if for CNG connections, and color-coded **green**, if for oxygen connections.

Piping in systems must be run as directly as is practical from one point to another, with as few fittings as practical. The use of nonmetallic pipe tubing, or hose for permanently interconnecting gas containers must be prohibited. All piping and tubing must be protected against damage by vehicles and by corrosion-causing substance.

3.1.4 Moving Compressed Gas Containers

A compressed gas container must not be rolled on its side or its rim. It must be moved only by using approved lifting equipment. Containers must never be dropped or thrown from any height. Before transporting any compressed gas containers make sure that the valves are tightly closed.

Compressed gas containers should be moved in an upright position, and must be moved using an approved method. Where containers are moved by hand cart, the hand truck or other mobile device must be designed for the secure movement of containers. Carts and trucks utilized for moving compressed gas containers outdoors must be designed so that the containers will be secured against dropping, or otherwise striking against each other or other surfaces. Ropes, chains or slings must not be used to suspend compressed gas containers unless such containers have been designed for such handling. Valves of compressed gas containers must not be used for lifting.

If the compressed gas containers need to be transported between different floors, if possible use an elevator (e.g. freight elevator, construction elevator, or passenger elevator when approved), and such elevator shall be occupied by the minimum number of persons.



1. Compressed gas container should be used, handled, and stored in upright position, except those designed for use in a horizontal position.
2. Compressed gas containers placed on carts and trucks must be individually restrained.

3.1.5 Storing Containers

The Certificate of Fitness holder is responsible for the safe storage and use of the gas containers. The CNG and other flammable gases container storage must be located away from the following: electric power lines; piping containing flammable or combustible liquids; piping containing flammable gases; and piping containing oxidizing materials.

CNG and oxygen containers not connected for use must be stored in a designated storage area used only for that purpose. Such storage area must be well-ventilated, away from heat sources, and at least **3 feet** from any combustible material. CNG and oxygen containers must be stored separately, either at a distance of not less than **20 feet** or **separated by a ½ hour fire-rated wall not less than 5 feet high**.

(1) Separation from hazardous conditions

All compressed gas containers and systems in storage or use shall be away from materials and conditions that present potential hazards to them or to which they present potential hazards. It is recommended to group containers according to the type of gas (e.g. flammable, oxidizer) or whether containers are full or empty, if they are stored at the same location. Oxidizing gases shall not be stored/used or come in contact with oil, grease, or other petroleum base.

Generally, the compressed gas containers shall be kept away from

- Sources of ignition
- Temperature extremes (Above 125 °F or less than mean low atmospheric temperatures)
- Corrosive chemicals or fumes
- Falling objects

- Public tampering
- Ledges, unprotected platforms, and elevators or other areas where the container could drop a distance exceeding one-half the height of the container

(3) Quantity Limitation

CNG storage and use for torch operation in the manufacture of jewelry shall comply with the following requirements: (a) the storage and use of CNG must be limited to a total capacity not exceeding 381 SCF of gas in a single fire area; (b) Storage and use of oxygen containers in connection with such torch operations must be limited to a total capacity not exceeding 279 SCF in a single fire area. The Fire Department will not permit CNG and oxygen use in any one fire area in excess of this maximum capacity, irrespective of the number of manufacturing enterprises separately engaged in such torch operations within that one fire area.

All empty or in-use gas containers should be counted as full containers. In other words, the quantity of any empty gas container must be subject to the maximum allowable storage quantity.

3.2 Handling and Use of Piped Natural Gas

Piped natural gas is commonly used in some jewelry manufacturing or dental lab operations at fixed locations. Torches and tips for the device that utilizes piped natural gas and oxygen together must be suitable for the gases used, and shall be of a type acceptable to the Fire Department.

When piped natural gas is used with oxygen in any hot work operation, a listed protective device that serves as a combination flashback arrester and backflow check valve shall be provided at an approved location on both the natural gas and oxygen supply lines so as to ensure the safe operation of all devices, equipment and systems, including the utility gas meter. Where pressure of the piped natural gas supply is insufficient to ensure such safe operation, approved equipment shall be provided between the gas meter and the fuel-consuming appliance that increases such pressure to the level required for such safe operation. Such flashback arresters and check valves, pressure-increasing equipment, shall be installed as components of both new and existing installations.

Natural gas pressure supplied to a device shall not exceed 15 psig, and the oxygen supply pressure to a device shall not exceed the natural gas supply pressure. **When the natural gas supply pressure is less than 5 psig, a pressure booster shall be provided to increase the pressure to at least 5 psig, but not more than 15 psig.** However, in addition to the permit for conducting hot work using oxygen and flammable gas or for storing compressed gases, a separate site-specific permit is required to **compress a flammable gas**, including piped natural gas, to a pressure exceeding **6 psig**. In other words, a separate permit for compressing the natural gas is NOT required if the pressure booster is set to maintain the natural gas supply pressure between 5 and 6 psig.

3.2.1 Torch Booster

Torch boosters are designed to supply natural gas at elevated pressures to a torch, or through a manifold to multiple torches, used for cutting, brazing, or similar uses. Devices used to increase the pressure of piped natural gas shall be of a type for which a certificate of approval has been issued. The Certificate of Approval number shall be plainly and permanently stamped or otherwise fixed upon each torch booster. Any relocation of the torch booster from its original approved location shall report to the FDNY.

Torch boosters shall be equipped with a UL or other Nationally Recognized Testing Laboratories (NRTL) listed pressure regulator. The regulator will restrict outlet pressure from the torch booster to a maximum of 15 psig. This regulator shall be directly mounted to the bulkhead of the torch booster and before the listed combination flashback arrestor and back flow check valve. Hose and hose connections between torch booster to the torch, shall comply with CGA E-1, *Standard Connections for Regulator Outlets, Torches and Fitted Hose for Welding and Cutting Equipment*. FDNY highly recommends that the length of the hose/tubing should be as short as practical but in no case exceeds 8 feet. Only approved/listed torch(es) can be used with the torch booster.

Torch booster shall be installed indoors in a well-ventilated area above ground level. The fan intakes and panel vents must be kept free of objects and materials that could restrict the flow of ventilation air. Most manufactures recommend that a minimum clearance of 12 inches should be maintained around the fans and vent louvers for proper ventilation. The boosters shall be installed away from high traffic areas. The space in which the torch booster is installed shall be maintained at the ambient temperature which is recommended by the manufacture.

A permanent decal or label shall be affixed on each torch booster indicating “CAUTION- Excessive nuisance shutdowns should be reported to the manufacture”. The use of a torch booster shall be limited to the indicated intent and shall not be used for other applications.



An approved device to boost gas pressure is required for the piped natural gas supply pressure is less than 5 psig.

3.2.2 Combination Flashback Arrestor and Backflow Check Valve

A UL or other Nationally Recognized Testing Laboratories (NRTL) listed combination flashback arrestor and backflow check valve shall be installed as follows:

- (1) On the oxygen supply line, between the final oxygen supply pressure regulator and each fuel consuming device;
- (2) On the natural gas supply line, between the final natural gas supply pressure regulator and the fuel consuming devices.



Flashback arrestor check valves normally come in pairs: one piece with the red striped is installed on the natural gas pipe and the second piece with the green striped is installed on the oxygen pipe. However, you must always follow the manufacturer's instruction to identify the flashback arrestors.

PART 4. PORTABLE FIRE EXTINGUISHERS

A portable fire extinguisher with at least a 2-A:20-B:C rating must be readily accessible within 30 feet of the location where hot work is performed. In case of fire, 911 must be called.



In the event of a fire extinguisher has been discharged, a fully charged replacement is required before work can resume. **The C of F holder is recommended to be trained for the use of portable fire extinguisher.**

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 building fire extinguishing systems or trained firefighters only. In case of any fire, FDNY must be notified. 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.

All fire extinguishers must be installed so that the top of the extinguisher is not more than 5 ft above the floor and the clearance between the bottom of the extinguisher and the floor is not less than 4 in. In other words, **no fire extinguisher is allowed to put on floor.**



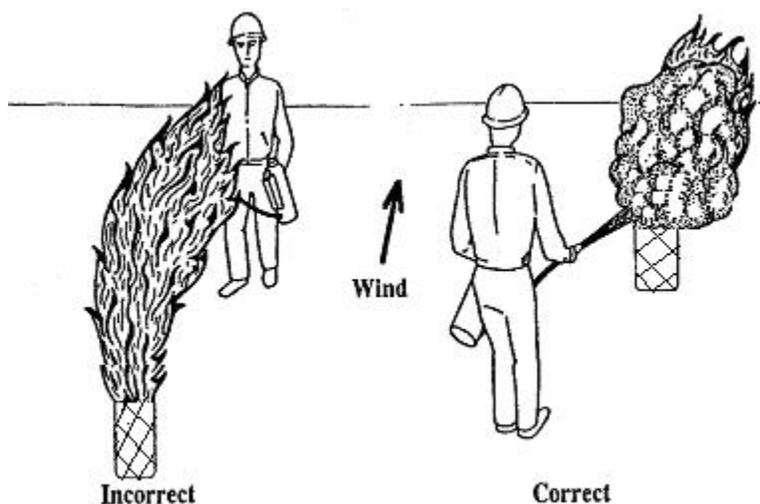
- (1) The top of the fire extinguishers must not be more than 5 ft above the floor.
- (2) The fire extinguishers must be accessible and unobstructed.



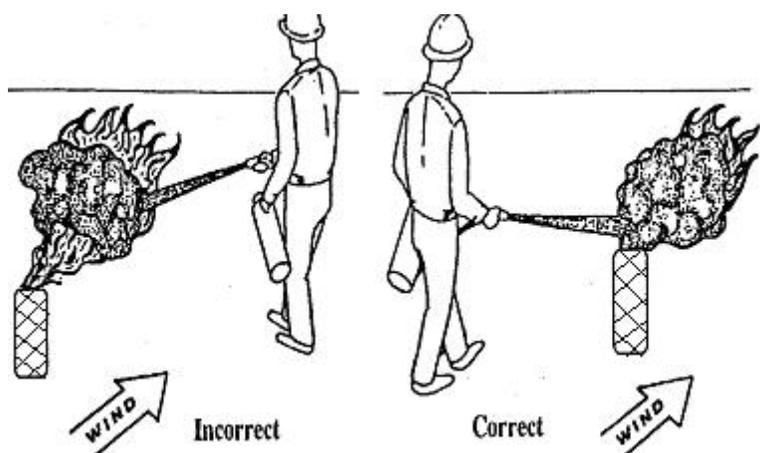
The bottom of the extinguisher must be at least 4 in above the floor.

4.1 Operation Instructions for a Fire Extinguisher

Special care must be taken when extinguishing a gas fire caused by a leak. The easiest way to extinguish the fire is to shut off by using the Emergency Shut Off valve until the flame is extinguished. **In case of any fire, Fire Department must be notified.** The flame must be approached from an upwind direction. This will prevent the Certificate of Fitness holder from being burned by the flames. **Never approach a fire from a downwind direction.** The correct ways to approach a fire are shown below.



The dry chemical stream must be directed toward the point where the flame begins. **Do not direct the chemical stream at the center of the flame.** This will not extinguish the fire. The correct way to direct the dry chemical stream is shown below.



For the piped gas, the gas supply must be shut off first and then call 911. This is safer than allowing the flammable gas (e.g. acetylene or LPG) to leak out. A flammable gas leak could result in a serious explosion if it were ignited. **Never attempt to extinguish the flame unless the gas supply shut. When it is not possible to shut off the gas supply (e.g. the fire is near the control valve or the shut-off valve) and the gas supply is limited (e.g. it is from a cylinder), allow the flame to burn itself out and call 911 immediately.** In the mean time, you

should try to control the scene and prevent the fire spreading to the surrounding materials. **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 building fire extinguishing systems or trained firefighters only.

4.2 Fire Extinguishers

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. A description of the classes of fires and the appropriate extinguishers are described below.

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 more than 2 Classes fires. Examples of some fire extinguishers are shown below.

Examples of fire extinguishers



4.3 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.

CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL	
A	Wood, paper, cloth, trash & other ordinary materials.		 <p>Class A, B & C Fires Multi-purpose Fire Extinguisher</p>
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.		 <p>Class A & B Fires</p>
K	Cooking media (Vegetable or Animal Oils and Fats)		

Fire Extinguisher Identification Symbols

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.

4.4 Fire Extinguisher Inspections

The extinguishers are required to be inspected monthly. The owner of the premises 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. It is intended to give reasonable assurance that the fire extinguisher is fully charged and operable. This is done by verifying that it is in its designated place, that it has not been actuated or tampered with, and that 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. Such recordkeeping must be either attached to the extinguisher or on an inspection checklist maintained on file. Labels or markings indicating fire extinguisher use, or classification, or both shall be placed on the front of the fire extinguisher. 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.

