STUDY MATERIAL FOR
CONSOLIDATED EXAMINATION C-99 FOR:

C-06 Dispensing CNG at a Full/Self Service Station

C-07 Supervision of a self-service CNG Station

C-08 Maintenance of a CNG Facility

C-09 Supervision of a Full Service CNG Station

These study materials will help you prepare for the written examination for the certificate of fitness for dispensing, supervision, and maintenance of CNG facilities. The study materials include information taken from the Fire Prevention Code, NFPA Standards, and the Fire Prevention Rules of the New York City Fire Department. The study materials do not contain all the information you need to know in order to supervise and maintain a CNG facility safely and efficiently. 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.

All questions on the Certificate of Fitness examination are multiple choice, with four alternate answers to each question. There is only one correct answer for each question. If you do not answer a question or mark more than one alternative, your answer will be scored as incorrect. A score of 70% correct 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 Washington.
   (B) Bill Clinton.
   (C) Malcolm X.
   (D) Martin Luther King.

   The correct answer is "A". You would mark "A" on your answer sheet.

2. What sports team plays at Shea Stadium in New York?
   (A) Giants.
   (B) Red Sox.
   (C) Cardinals.
   (D) Mets.

   The correct answer is "D". You would mark "D" on your answer sheet.

New York City has encouraged the conversion of gasoline powered motor vehicles to compressed natural gas (CNG) for the purpose of reducing carbon monoxide emissions. During recent years, the number of CNG powered vehicles in New York City has grown from less than five to over 400. Recent studies conclude that by the year 2001, there will be as many as 2 million vehicles in major urban areas converted to CNG, and 3.8 million vehicles will be fueled by CNG by the year 2005. This huge increase in the projected number of CNG powered vehicles is attributable to the recent federal clean air acts. In an effort to meet the projected demand for CNG, plans have been developed to install CNG stations throughout New York City. This document outlines New York City Fire Department regulations for supervising and maintaining a CNG facility. For example, these regulations require all dispensing operations to be conducted by a person holding a certificate of fitness for dispensing and handling CNG. All supervisory and maintenance related activities must be conducted by a person with a certificate of fitness for the supervision and maintenance of CNG facilities. Certificate of fitness holders are responsible for ensuring that fire department regulations are obeyed on the premises at all times. Some of the regulations related to storage dictate that all bulk storage tanks must be designed to meet American Society of Mechanical Engineers (ASME) design specifications and that all storage and shipping containers must meet the Department of Transportation (DOT) design specifications.

Compressed Natural Gas

CNG is a mixture of flammable hydrocarbon gases and vapors consisting primarily of methane in a compressed gaseous form. In its natural state, CNG is an odorless, tasteless and nontoxic gas, weighing two-thirds the weight of air. However, only odorized CNG may be dispensed from CNG stations in New York City. The odorization of the CNG allows any leaks to be rapidly detected. Although CNG is nontoxic, it can cause asphyxiation if released into a confined area where it displaces more than 21 percent of the oxygen in the atmosphere.

CNG Stations

The fire department recognizes and approves the use of three types of CNG stations in New York City: stationary stations, mobile stations and mobile cascades. These stations are used to dispense CNG at regulated pressures into DOT approved cylinders or containers. Generally, the CNG is dispensed into portable cylinders to be used in motor vehicles and/or tanks mounted on motor vehicles. CNG may also be used for other purposes when fire department approval has been secured.

Stationary CNG Stations

Stationary CNG stations are commonly installed in utility companies or other locations deemed suitable by the fire commissioner, including automotive service stations, bus depots, and fleet garages. The stationary CNG station consists of an assembly of components, which include a compressor, a dispenser, valves and piping, and a storage system. The compressor is used to draw the gas from a distribution pipeline and compress it into the storage system. Then the CNG is dispensed from the storage system into cylinders mounted on motor vehicles. Fire department regulations require stationary CNG stations to be located outdoors at grade level. However, under certain conditions, the fire department may permit the installation of stationary CNG stations on rooftops or inside buildings.

Mobile CNG Stations

A mobile CNG station consists of an assembly of components, which include a compressor and a dispenser, mounted on a motor vehicle. Mobile stations are designed to draw CNG from a CNG supply source and dispense it into vehicle mounted cylinders. Several fire department regulations must be obeyed when operating mobile CNG stations. These regulations include the following:

· Mobile stations must be operated outdoors.

· The mobile station's wheels must be chocked to prevent rolling when connected to the bulk storage tanks.

· The mobile station must be equipped with a mobile telephone to be used to contact the fire department in case of an emergency. The certificate of fitness holder must make sure that the telephone's battery is always charged and that the phone is kept outside of the vehicle during compressing and filling operations.

· The vehicle being filled must be electrically grounded to the mobile CNG station to prevent the ignition of the CNG due to static buildup.

· The engines and ignitions of the mobile CNG station and the vehicle being filled must be off during filling operations.

· Decals, with minimum one-half inch letters reading MANUAL CYLINDER SHUT-OFF VALVE, must be placed on the appropriate access doors.

· At least one dry chemical fire extinguisher must be installed on each mobile CNG station.

In some cases, the fire commissioner may require additional safety features to be installed on the mobile station.

Mobile CNG Cascades

A mobile CNG cascade consists of several cylinders mounted on a trailer or motor vehicle. CNG is stored inside the cylinders under pressure and the cylinders are connected with steel piping. The certificate of fitness holder transfers the CNG from the mobile cascade into vehicle mounted cylinders. Mobile cascades are commonly used as a temporary CNG supply when there is a problem with a stationary CNG station. Several regulations which must be obeyed when operating mobile cascades include the following:

· High, medium, and low pressure CNG container banks and their shut-off valves must be color coded for easy identification. The color coding system is as follows:

Pressure	**Color**
High	Black
Medium	Green
Low	Orange

· The pressures corresponding to the black, green and orange container banks must be clearly identified on the cascade unit.

· Decals, reading COMPRESSED NATURAL GAS in 6 inch high red letters, must be placed on each side and the rear of the unit.

· The emergency shut-off valve must be identified by placing decals, with minimum one-half

inch letters reading MANUAL CYLINDER SHUT-OFF VALVE, next to the emergency shut-off valve. The shut-off valve must be protected against physical damage and excessive vibration.

- At least one dry chemical fire extinguisher must be installed on each mobile cascade.

- When the mobile cascade is used as a temporary replacement for a stationary CNG station, the mobile cascade must be positioned in an approved dispensing area. The certificate of fitness holder must notify the fire department when the mobile cascade is used to replace the standard dispensing unit. This will allow the fire department to modify its fire fighting strategies should an emergency arise.

In some cases the fire commissioner may require additional safety features to be installed.

Compressor Assemblies

A compressor assembly includes the compressor, interstage piping, storage vessels, pressure relief devices, and a control panel. The compressor uses suction to draw the CNG from a supply source and then transfers it through the station's pipelines and hoses under pressure. In some stations, the compressor discharges the CNG into a storage system for later use. In other stations it pumps it directly to the dispensing unit. Either a natural gas engine must drive all compressors or an explosion proof electric motor, approved for use in Class I installations (i.e. hazardous locations).

A control panel is used to regulate the operation of the compressor. This panel should be installed in a remote operation booth. A manually operated shut-off switch must be installed in all CNG stations. It should be used by the certificate of fitness holder to quickly shut down the compressor during an emergency. For example, it may be used when there is concern about suction pressure, discharge pressure, or motor temperature. It should also be used during a fire emergency to shut down the compressor. Fixed CNG compressors must be installed at grade level and may be housed in a building or enclosure that meets the design specifications of the New York City Buildings Department. The building or enclosure must not be used for any other purpose. Compressor buildings and enclosures must be ventilated to ensure that the gas-air mixture never exceeds 20% of the lower explosive limit (LEL) under normal leakage conditions. In other words, the ventilation system must be able to compensate for minor leaks in the CNG system caused by loose piping connections, damaged gaskets, etc. The LEL is simply defined as the lowest concentration of CNG in air that may be ignited. Compressor buildings and enclosures must also be provided with explosion venting designed to vent the combustion gases into the atmosphere in case of an explosion. Typically, explosion venting arrangements include: (a) constructing the walls and/or roof of the building with light materials, and (b) installing lightly fastened hatch covers or doors in exterior walls and/or lightly fastened walls or roofs.

Heating methods for the compressor buildings or enclosures must be free of ignition sources. Fire department approved heating sources include catalytic heaters, encased electric heating (such as within the concrete floor slab of the enclosure or building), explosion-proof forced air heating and steam and hot water taken from an outside source. Open flames or other potential ignition sources must never be taken into the compressor building or enclosure. Smoking is never permitted in the compressor building or enclosure.

CNG Cylinders and Containers

Cylinders used for the shipping and storage of CNG must meet the design specifications established by the DOT. When bulk storage containers are used they must conform to the design specifications of ASME or

the DOT. Approved cylinders and containers are stamped or labeled with DOT or ASME approval markings. The certificate of fitness holder must make sure that CNG is dispensed in approved containers only. A cylinder rupture might occur when CNG is dispensed into a cylinder or container that does not have DOT or ASME certification.

Cylinder and Containers on Motor Vehicles

CNG cylinders, containers, and other components required to fuel a motor vehicle must be installed such that gas can neither enter the passenger compartment nor accumulate in the trunk, cargo space, or any other enclosed space in the vehicle. They must also be mounted in a location that protects them against physical damage, vibration, and impact. Each CNG powered vehicle must be identified by weatherproof signs placed on each side of the vehicle and on the front bumper. When no bumper is installed, the sign must be mounted at least 15 inches, but not more than 30 inches, above the ground near the front left side (passenger side) of the vehicle. An accessible manual shut-off valve must be provided in each CNG powered vehicle. This valve must be positioned such that it is protected against physical damage and vibrations. A clearly visible sign indicating the location of the shut-off valve must be mounted on the vehicle.

Storage

CNG cylinders and containers must be stored in a dry and adequately ventilated area where they are protected against tampering and physical damage. It is especially important that these areas are protected against vandalism by fencing or other means acceptable to the Fire Commissioner. Signs must be posted outside the storage area indicating that smoking and open flames are prohibited.

Minimum Clearances

The certificate of fitness holder must make sure that flammable and combustible materials, liquids, gases, etc. are kept a minimum distance away from CNG stations and storage areas. The table below indicates the minimum distances required.

Exposure	**Clearance**	
	Outdoors	In a CNG building or compressor enclosure
Readily ignitable material.	10 feet	5 feet
Above ground storage of flammable or combustible liquids.	20 feet	10 feet
Storage of flammable or oxidizing gases.	10 feet	5 feet
Above ground piping containing flammable or oxidizing gases or flammable or combustible liquids, excluding piping used to dispense other motor vehicle fuels.	20 feet	10 feet
Below ground storage of		

flammable or oxidizing gases or flammable or combustible liquids, including piping.	5 feet	5 feet
Any source of ignition including motor vehicles, except those entering or departing the fueling area and those being fueled.	10 feet	5 feet
Intakes of ventilation or air conditioning equipment or air compressors.	25 feet	25 feet
Lines of adjoining property which may be built upon.	10 feet	5 feet
Adjacent buildings of other than masonry or concrete construction.	10 feet	5 feet
Adjacent buildings of masonry or concrete construction.	5 feet	0 feet
Openings of adjacent buildings.	15 feet	10 feet
Hospitals, schools, theaters, or other places of public assembly or amusement where 50 or more people congregate.	20 feet	10 feet
Public street or sidewalk.	10 feet	5 feet
Nearest rail of any rapid transit elevated line or the main track of any railroad excluding underground railway.	50 feet	25 feet
Overhead electrical transmission or distribution line.	25 feet	25 feet
Other motor vehicle fuel dispensers (gasoline, diesel, methanol, etc.) Dispenser	5 feet	5 feet
Compression and Storage	10 feet	5 feet

Smoking and Open Flames

Smoking or the use of any open flame is never permitted within 10 feet of any component of the CNG system. Signs must be posted indicating that smoking is prohibited. Periodically, welding, cutting, or

similar "hot" work may need to be conducted on the CNG station. In such cases, open flames may be used when fire department permits have been secured and the entire system has been purged of CNG.

Electrical Equipment

All electrical equipment installed inside any CNG building, compressor enclosure, or CNG storage area must meet Class I specifications (i.e. approved for use in hazardous locations). Electrical equipment installed outdoors and within 10 feet of the compressor, storage system, or dispenser system must also be approved for use in hazardous locations.

Safety Devices

Several safety devices are required by the fire department in CNG stations. The certificate of fitness holder must know and understand how these devices operate. Some of the safety devices required are outlined below.

Gas Detection Systems:
A combustible gas detection alarm system, meeting the standards established in the New York City Building Code, must be installed in all indoor CNG stations or compressor enclosures. This system is designed to automatically activate an audible and/or visual alarm when the CNG concentration in the atmosphere exceeds 20% of its lower explosive level (LEL). The system will automatically cut off the gas supply at 50% of the LEL and simultaneously transmit the alarm to the fire department via an approved Central Office Connection.

Heat Detection Systems:
Closed circuit detection devices designed to detect the heat generated by a fire must be installed in each outdoor CNG station, CNG building, or compressor enclosure. Heat detection systems for CNG buildings and compressor enclosures must automatically activate the facility's extinguishing systems and an audible and/or visual alarm when a fire is detected. They must also shut off the gas supply to the compressor and transmit an alarm to the fire department via a central monitoring station when a fire is detected. When an outdoor CNG facility is installed further than 25 feet away from a building and its storage capacity is less than 35,000 standard cubic feet, the closed circuit detection device is not required to transmit an alarm to the fire department via a central monitoring station.

Automatic Shut-off Valve:
An automatic shut-off valve connected to the gas piping system will be installed on CNG stations to automatically cut off the CNG gas supply in case of an emergency. The valve must be positioned upstream of the confined high pressure gas piping. The valve must be installed underground or otherwise protected from exposure to fire and physical damage in a manner acceptable to the fire commissioner.

Remote Manual Shut-off Switch:

A manual shut-off valve, designed to cut off the gas supply to the CNG station in case of an emergency, must be installed in the gas feed line. The certificate of fitness holder must make sure that the valve is protected against physical damage and kept accessible at all times. This valve is required in addition to any automatically operated shut-off valves. The distance between the remote shut-off valve and the compressor inlet, or any part of the storage system or dispenser system, is indicated in the table below.

CNG Station Operating Gas Flow (SCFM)	Minimum Distance (Ft.)
up to 100	15
200	19
300	23
400	27
500	30
600	33
700	35
over 700	Subject to Fire Commissioner's approval

Note: SCFM = Standard Cubic Feet per Minute Protection

Pressure Relief Devices:
According to DOT regulations and the ASME unfired pressure vessel code, all CNG cylinders and storage tanks must have a pressure relief device installed. These devices are designed to release the gas from the cylinder or container when the pressure inside reaches dangerous levels. For example, the pressure relief device may open and vent the CNG to the atmosphere when the cylinder is overfilled or exposed to extreme temperatures. Typical pressure relief devices consist of rupture disks, fusible plugs, combination rupture disks fusible plugs, and pressure relief valves. The position of the pressure relief device and its pressure rating must be labeled on the CNG container or cylinder. The certificate of fitness holder must make sure that the pressure relief devices are protected against tampering and physical damage. If any adjustment to these devices is required it must be performed by a representative of the manufacturer. When a pressure relief device blows, a popping sound followed by a hissing sound will occur as the gas leaves the container or cylinder. Some CNG stations are designed so that an alarm will sound when a pressure relief device opens and vents into the atmosphere. In such cases when a pressure relief device vents, the certificate of fitness holder must immediately stop all compressing and dispensing operations.

Pressure-Limiting Device:
An automatic pressure-limiting device, designed to automatically shut down the compressor when the gas discharge pressure reaches dangerous levels, must be installed on each CNG station. This prevents the cylinder being filled from being overcharged and rupturing.

Vehicle Fueling Connections:
Hoses used for the dispensing of CNG must be connected to the dispenser by means of a quick-disconnect coupling. This coupling will separate and automatically stop the flow of gas from the dispenser if a vehicle should pull away during dispensing operations. The quick disconnect couplings are also designed to prevent leakage when connecting or disconnecting the dispensing hose to the cylinder or container. Excess-flow valves, or other suitable automatic shut-off devices, must be provided in dispensing system lines to provide for emergency shut-off in the event of pipe breakage, hose rupture, or hose separation from dispenser system. This device must be located as close as is practical to the storage system discharge manifold.

Dispensing Operations

The certificate of fitness holder must make sure that CNG cylinders are never overfilled because overfilling can result in the rupture of the cylinder or an explosion. He or she should check the capacity of the cylinder by reading the label attached to the fill line before beginning dispensing operations. When a label is not

present, the certificate of fitness holder can determine the maximum fill pressure of the cylinder by reading its DOT markings. This is extremely important because the maximum fill pressure differs depending on the type of cylinder used. Currently, the maximum fill pressure of DOT approved cylinders is 3000 psi. The cylinder connection must also be inspected for physical damage that may cause leaks. The certificate of fitness holder must never dispense CNG into a defective CNG cylinder.

Dispenser Unit

A computerized card reader is used to verify all accounts. Dispensing must be initiated with a remote switch located in the kiosk or control booth activated by the person holding a certificate of fitness for dispensing and compressing.

The CNG dispenser must stop the filling operation when the nozzle has been turned to its bracket. Any further filling must be authorized by t he Certificate of Fitness holder stationed at the control booth.

Dispensing Hoses

Vehicle fueling hoses must be compatible for use with natural gas service and for the pressure intended and must withstand a pressure of at least four times the maximum operating pressure. Hoses for fueling a vehicle must be of the retractable design and must be protected against mechanical injury, tested for leaks with soapsuds or equivalent leak detection method at least annually by a person holding a Fire Department Certificate of Fitness and must be replaced if damaged. Notarized affidavits of visual inspections must be maintained on site for at least five years after inspection.

Connector for hoses that connect cylinders or containers being charged must be quick-disconnect, rated for service and pressure intended and designed to withstand twice the maximum filling pressure and equipped to prevent leakage on connecting or disconnecting to cylinders or container being filled. Accidental disconnects of the hose must also cause automatic shut-off of gas flow.

Hoses must be connected to dispenser by means of a quick-disconnect coupling. The coupling must be of an approved type. The connection to the dispenser must be such that if a vehicle should pull away while connected, the connection will separate and stop the flow of gas from the dispenser.

Grounding

All piping, compressors, storage systems, cylinders and containers installed on CNG stations must be electrically grounded. Vehicles with a cylinder or container installed must be grounded during dispensing operations. The electrical grounding reduces the likelihood of accidental ignition of the CNG due to sparks generated by static electricity build-up. Grounding may be accomplished by running a metal wire from the fill connection to an approved grounding source using an adjustable clamping device. For example, the equipment may be grounded to a 6 ft steel rod driven into the ground.

Servicing the CNG System

The certificate of fitness holder must make sure that the CNG station is serviced according to the manufacturer's recommendations. For example, the certificate of fitness holder should make sure that the compressor's oil is changed periodically. The certificate of fitness holder should not mix different viscosity or brands of oil in the CNG system. Each time the oil is changed, the affected areas must be checked for leaks using a soap and water solution. All defective parts must be repaired or replaced before the system is restarted.

Hot work (e.g., welding and cutting) may be required during emergencies or when the system is being repaired or serviced. In such cases, a fire department permit must be secured and authorization from the certificate of fitness holder responsible for the supervision and maintenance of the CNG station must be obtained. The certificate of fitness holder must make sure that the fire department permit has been secured before granting permission to perform "hot" work in the facility. Under no circumstances should the certificate of fitness holder grant permission to perform "hot" work unless all required fire department permits have been secured.

Fire Protection and Prevention Systems

The fire department requires fire protection and prevention systems to be installed in CNG stations. The certificate of fitness holder should make sure that these systems are maintained in good working order at all times. Some of these systems required are briefly described below.

Extra Hazard Extinguishing Systems

Automatic, extra hazard fire extinguishing systems must be installed in all indoor CNG stations. Typically, a Halon 1301 and/or a dry chemical system or an equivalent is installed. Any fire extinguishing system installed in a CNG station must meet the standards established by the New York City Buildings Department, the Fire Department, and NFPA 17. These extinguishing systems are automatically activated by closed circuit fire detection systems during a fire emergency. They may also be manually operated from a designated remote location in case of an emergency. Once operated, an audible or visual alarm is sounded on the premises. In some cases the alarm is also automatically transmitted to the fire department via a central monitoring station. When a fire extinguishing system is discharged, the system must be fully recharged and inspected prior to re-starting CNG dispensing operations.

Fire extinguishers

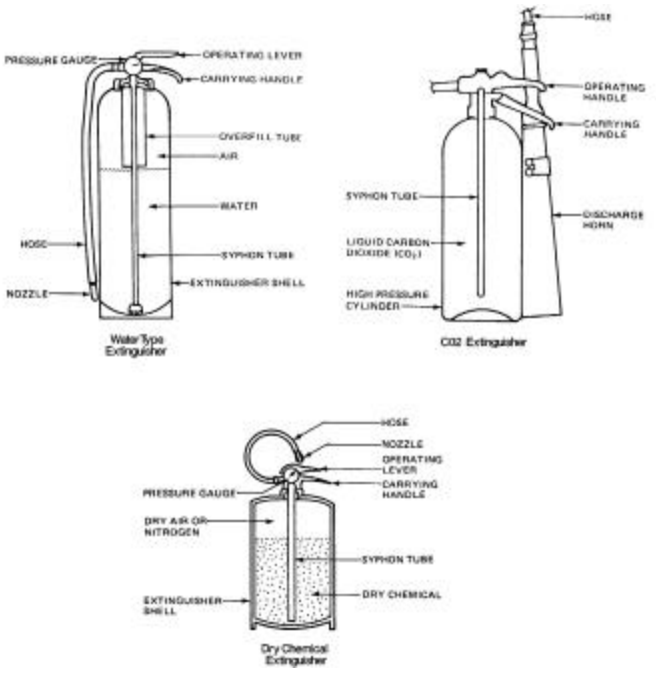
At least one portable dry chemical or equivalent fire extinguisher must be installed at each CNG station. Additional fire extinguishers may be required by the fire department in some CNG stations. The certificate of fitness holder should make sure that all required extinguishers are installed and maintained in good working order at all times. The certificate of fitness holder must know how to operate the extinguishers in a safe and efficient manner. He or she must know the difference between the various types of extinguishers and when they should be used. Three classes of fires and the appropriate extinguishers are described below.

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

Class B Fires occur when flammable liquids, gases or greases are ignited. These fires must be extinguished by smothering the flame. The flame may be smothered using carbon dioxide, dry chemical or foam extinguishers. Water type extinguishers will not effectively extinguish class B fires. These extinguishers are must be used when attempting to extinguish a fire at a CNG station.

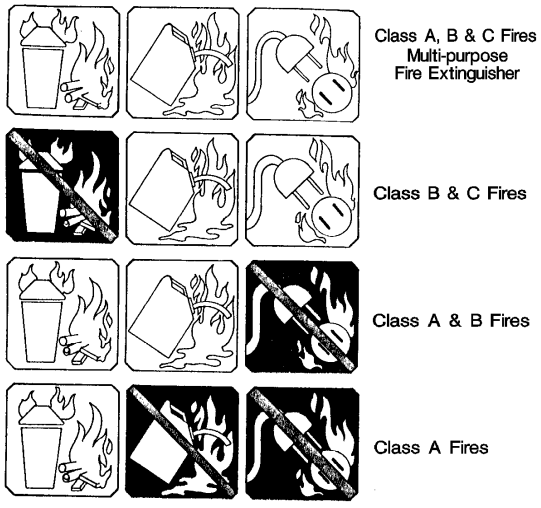
Class C fires occur when electrical equipment catches fire. These fires must be fought with fire extinguishers that do not conduct electricity. Carbon dioxide and dry chemical extinguishers must be used to extinguish electrical fires. Foam and water type extinguishers must not be used to extinguish electrical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

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



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.



Symbols Painted on Fire Extinguishers

A symbol with a shaded background and a slash indicates that the extinguisher must not be used for that type of fire. The certificate of fitness holder must understand these symbols and must make sure that the fire extinguishers are kept in good working order at all times.
Generally, operation instructions are clearly painted on the side of the fire extinguisher. They clearly describe how to use the extinguisher in case of an emergency. An example of these instructions is shown below.

Operation Instructions for a Fire Extinguisher

Signage

Several types of safety signs may be posted at various locations in CNG station. These signs must indicate:

· The general fire safety procedures to be followed during a fire emergency.
· How to sound the fire alarm.
· The location of the manual shut-off switch.
· The location of fire extinguishers.
· How to use the fire extinguishers and related fire fighting equipment.
· That smoking and open flames are prohibited within 10 feet of a CNG Station.

The certificate of fitness holder must make sure that required fire safety signs are posted and clearly visible at all times.

Emergency Procedures

The certificate of fitness holder must know the locations of and how to operate all fire extinguishing devices, control devices, and fire alarm stations required at his or her CNG station. In case of a fire, explosion, major leak or other emergency, the certificate of fitness holder must notify the fire department by phone immediately and activate the alarm system. The certificate of fitness holder must know the telephone number of the fire department Borough Communication Office. The borough phone numbers are listed below. These phone numbers must be posted near the phones most likely to be used in case of an emergency.

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

In some cases, the activation of the fire alarm will transmit a signal to the fire department via a central monitoring station. The certificate of fitness holder must answer any questions asked by the fire fighters when they arrive. The Bureau of Fire Prevention should be notified as soon as possible after an explosion or

fire has occurred. The Bureau of Fire Prevention may require a detailed report on the causes and the consequences of the explosion or fire. Generally, this report must be filed within ten days after the incident.

CNG Fires

When a CNG fire occurs, the best way to bring it under control is to shut off its supply source and allow the fire to burn itself out. However, it may not be possible to shut off the supply source in many situations. In such cases, the fire should be allowed to burn itself out and a water spray should be discharged onto the CNG station, dispensing units, compressors, and related equipment. The water spray will have a cooling effect and will help prevent an explosion. The water spray should also be discharged onto storage cylinders and flammable materials located near the fire.

Choosing the Correct Extinguishing Agent

When attempting to extinguish fires involving materials other than CNG, care must be taken to make sure that only appropriate extinguishing agents are used. For example, only non water-based foam extinguishers should be used on fires involving water soluble flammable liquids. Water based foam extinguishers are ineffective on these fires because the flammable liquid destroys the foam blanket. The certificate of fitness holder must contact the manufacturer when there is some doubt about when or how a particular extinguisher should be used.

Inspections

The certificate of fitness holder should ensure that the fire protection systems are fully charged at all times and that all scheduled inspections, service, and repairs are performed.

Fire Department Inspections

Fire department inspectors will conduct periodic inspections of the CNG station and all required permits. Enforcement action may be taken against the certificate of fitness holder and the owner of the CNG station when fire department regulations are not obeyed, or when the permits are not secured and posted. These actions may include fines and the revocation of the certificate of fitness.

Fire Extinguisher Inspections

The extinguishers must be inspected by a qualified technician at least once every six months. Generally, the inspections are conducted by a representative of a maintenance company. The certificate of fitness holder should record the testing date and the technician's name in the inspection log. All inspections must also be recorded on a tag attached to the extinguisher.

In addition, the certificate of fitness holder should visually inspect the fire extinguishers monthly. He or she should make sure that they are positioned in the correct locations and are clearly visible. When a damaged extinguisher is discovered, it should be repaired or replaced immediately. The certificate of fitness holder should check to make sure that the fire extinguisher is fully charged. The condition of the extinguisher is checked by looking at the gauge connected to the top of the extinguisher. A needle that indicates the extinguisher's condition is positioned inside the gauge. When the needle points to the green area, the extinguisher is fully charged. When the needle points to the red area, the extinguisher needs to be recharged. When extinguishers need to be recharged, the certificate of fitness holder should make the arrangements to have it recharged.

Recommended Inspection Procedures

The certificate of fitness holder should make regular inspections and patrols of the assigned area of responsibility to make sure that fire protection systems, storage containers, and related equipment are in good condition. Defective components (e.g., leaking faucets) should be replaced promptly. The certificate of fitness holder must notify the fire department and his or her supervisor when major defects are discovered (e.g., when the sprinkler system is inoperative). Violations may be issued and enforcement action taken against the certificate of fitness holder when major defects are not reported. Although the inspections will vary depending on the location, the following general guidelines will apply for all locations.

- The entire premises must be checked daily for potential ignition sources. Any potential ignition sources that are discovered must be corrected or removed immediately. For example, frayed electrical wires and defective electronic components must be either repaired or removed.

- Trash and garbage must not be allowed to accumulate anywhere inside the storage areas. Accumulated trash is a fire hazard because it may be easily ignited by a stray spark. All trash and garbage must be removed from the premises.

The entire system should be visually inspected by the certificate of fitness holder before starting the system each day. Defects must be repaired before the system is placed into operations. All inspections and defects should be recorded by the certificate of fitness holder.
Records

The certificate of fitness holder should keep a comprehensive record of all incidents (such as fire, leaks, and defective fire protection systems) and of equipment maintenance. These records should be made available to fire department representatives upon request.

Testing

All CNG Station gas piping (excluding non-welded stainless steel tubing utilizing compression fittings) must be hydrostatically pressure tested, in the presence of a fire department inspector, at twice the maximum operating pressure for one hour. In the case of prefabricated systems, a notarized certificate from the manufacturer attesting to satisfactory completion of the said test is acceptable. All tie-in connections and stainless steel tubing utilizing compression fittings must be tested for leaks using the soap and water solution test.

Vehicle fueling hoses must be tested for leaks using the soap and water test at least annually by the certificate of fitness holder. Defective or damaged components must be replaced promptly. Notarized affidavits of visual inspections must be maintained on site for 5 years after inspection. CNG cylinders and containers must be hydrostatically tested every five years or more frequently if required by the DOT.

Fire Department Permits

A fire department permit is required for the compression, storage, sale, and use of high pressure natural gas. A fire department permit is also required for a CNG powered motor vehicle when the capacity of its CNG cylinder exceeds 2.5 cubic feet or when the total capacity of two or more of its cylinders exceeds 10 cubic feet.

Special Instructions for Fire Suppression systems for Self-service Fueling

1. The fire suppression system must be installed to provide protection for the entire fueling island and the fueling areas.

2. An inspection, test and servicing of the suppression system must be made on behalf of the owner, at least every six months. Records of all repairs, tests, and inspections must be kept on the premises and made available for Fire Department inspection.

3. The installation, maintenance, repair, modification, extension, or alteration of the fire suppression system must be done by a licensed master fire suppression contractor who is qualified by the manufacturer.

4. All gauges on the fire suppression system must be positioned so as to be easily read from grade.

5. If the fire suppression system or portion of the fire suppression system has been discharged or is inoperative, the attendant must ensure that the Fire Department is notified. It is unlawful to operate the unprotected dispensers as self-service until such time that the suppression system is restored to full operability.

6. In addition to the requirements for a fixed fire suppression system for the fueling areas, two 40 BC (UL listed) fire extinguishers must be provided near the fueling island and the control booth.
7. All controls, dispensing devices, suppression systems and the fire extinguishers are to be maintained in proper working order and good repair at all times.

8. The CNG service station must be operated so that movement of vehicles is orderly and consistent with the safe operation of the station.

9. No servicing or repair of motor vehicles in areas used for dispensing is allowed at any time.

10. The booth and dispensing islands must be kept clean and orderly; access to the controls in the booth and the pumps on the islands must be kept clear and unobstructed by equipment, merchandise or litter.