

NFPA 123

Standard for Fire Prevention and Control in Underground Bituminous Coal Mines

1999 Edition



National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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Standard for

Fire Prevention and Control in Underground Bituminous Coal Mines

1999 Edition

This edition of NFPA 123, *Standard for Fire Prevention and Control in Underground Bituminous Coal Mines*, was prepared by the Technical Committee on Mining Facilities and acted on by the National Fire Protection Association, Inc., at its Fall Meeting held November 16–18, 1998, in Atlanta, GA. It was issued by the Standards Council on January 15, 1999, with an effective date of February 4, 1999, and supersedes all previous editions.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

This edition of NFPA 123 was approved as an American National Standard on February 4, 1999.

Origin and Development of NFPA 123

In 1978 the Technical Committee on Mining Facilities, through its membership and current Mine Safety and Health Administration regulations, identified the need for guidance in fire prevention and control in underground coal mines. The first edition of NFPA 123 was developed through several subcommittee and committee meetings and was officially released as the 1987 edition.

A variety of important changes were included in the 1990 edition of NFPA 123. Most important among these were the addition of new criteria that specifically addressed protective signaling systems and automatic sprinkler systems used in underground bituminous coal mines. This material was developed in conjunction with the NFPA Technical Committees responsible for these fire protection systems, in accordance with the NFPA Standards Council policy on jurisdictional scope issues.

The 1995 edition incorporated the requirements that were previously included in NFPA 124, *Standard for Fire Protection of Diesel Fuel and Diesel Equipment in Underground Mines*, which was withdrawn. Further changes included editorial corrections and revisions that provided consistency with other NFPA mining related standards.

The 1999 edition clarifies the proper type of fire extinguishers to be used. Also, the references to fixed fire extinguishing systems have been changed to fixed fire protection systems because not all systems extinguish the fire. A reference to NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, has also been added.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on requirements for safeguarding life and property against fire, explosion, and related hazards associated with underground and surface coal and metal and nonmetal mining facilities and equipment.

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 6 and Appendix B.

Chapter 1 Introduction

1-1* Scope.

1-1.1* This standard covers minimum requirements for reducing loss of life and property from fire in underground bituminous coal mines.

1-1.2 This standard does not apply to the following:

- (a) Diesel fuel that has been modified with additives that reduce the flash point to less than 100°F (37.8°C)
- (b) Modified or unmodified diesel fuel used at altitudes where the flash point drops to less than 100°F (37.8°C)
- (c) Explosion hazards
- (d) Storage of flammable and combustible liquids produced in underground coal mines
- (e) Methane drainage systems
- (f) Spontaneous combustion

1-1.3 This standard is based on the current state of the art. Application to existing installations is not mandatory. Nevertheless, operating mines are urged to adopt those features of this standard that are considered applicable and reasonable for existing installations.

1-1.4 Nothing in this standard is intended to prevent the use of systems, methods, or devices of a quality, reliability, strength, fire resistance, effectiveness, durability, or safety equivalent to those prescribed by this standard. Technical justification or demonstration of equivalency shall be provided to the authority having jurisdiction.

1-2 Purpose. This standard was prepared for the use and guidance of those charged with designing, constructing, installing, examining, approving, operating, or maintaining fire prevention, fire protection, or fire-fighting equipment in underground bituminous coal mines.

1-3 General.

1-3.1 Because of the uniqueness of underground bituminous coal mines, provisions in this standard might differ from commonly accepted fire protection standards and guides devised for other types of occupancies.

1-3.2 Only those skilled in fire protection are competent to design and supervise the installation of mine fire protection systems. It might be necessary for those responsible for the storage of flammable and combustible liquids and the use of diesel-powered equipment within underground bituminous coal mines to consult an experienced fire protection specialist.

1-4 Definitions.

Approved.* Acceptable to the authority having jurisdiction.

Atmospheric Tank. A storage tank that has been designed to operate at pressures that range from atmospheric through 0.5 psi (a gauge pressure of 3.5 kPa).

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

Boiling Point.* The boiling point of liquid at a pressure of 14.7 psia (760 mm Hg).

Closed Container. A container sealed by means of a lid or other device so that neither liquid nor vapor can escape from it at ambient temperatures.

Combustible. Capable of undergoing combustion.

Combustible Liquid. A liquid having a flash point at or above 100°F (37.8°C).

Combustible liquids shall be subdivided as follows:

- (a) Class II liquids shall include those having flash points at or above 100°F (37.8°C) and below 140°F (60°C).
- (b) Class IIIA liquids shall include those having flash points at or above 140°F (60°C) and below 200°F (93.4°C).
- (c) Class IIIB liquids shall include those having flash points at or above 200°F (93.4°C).

Combustible Liquid Storage Area — Fixed. An area used for storage of Class II and Class III combustible liquids that is infrequently moved, and where the aggregate quantity present shall not exceed 5000 gal (18,925 L). Handling of liquids incidental to transfer can take place within a storage area.

Combustible Liquid Storage Area — Mobile. Self-propelled or mobile equipment fitted with suitable containers or tanks and other related fixtures used for the storage, transport, and dispensing of Class II and Class III combustible liquids. The aggregate quantity of combustible liquid carried on such equipment shall not exceed 1000 gal (3785 L).

Combustible Liquid Storage Area — Portable. An area used for storage of Class II and Class III combustible liquids that is periodically moved, and where the aggregate quantity present shall not exceed 1000 gal (3785 L). Handling of liquids incidental to transfer can take place within a storage area.

Container. Any vessel of 60 gal (227 L) capacity or less.

Diesel-Powered Equipment. Any device powered by a diesel engine.

Dry-Pipe Sprinkler System. A system employing automatic sprinklers attached to a piping system containing air or nitrogen under pressure, the release of which (as from the opening of a sprinkler) permits the water pressure to open a dry-pipe valve. The water then flows into the piping system and out the opened sprinklers.

Fire Detector. An automatic device designed to detect the presence of fire and initiate action.

Fire-Resistant Construction. Masonry walls or equivalent having at least a 1-hour fire rating, including compressible materials having an equivalent fire resistance capability.

Fire Risk Assessment. The evaluation of the relative danger of the start and spread of fire; generation of smoke, gases, or toxic fumes; and the possibility of explosion or other occurrence endangering the lives and safety of personnel or causing significant damage to property.

Fixed Fire Suppression System. A total flooding or local application system consisting of a fixed supply of extinguishing agent permanently connected for fixed agent distribution to fixed nozzles that are arranged to discharge an extinguishing agent into an enclosure (total flooding), directly onto a hazard (local application), or a combination of both; or an automatic sprinkler system.

Flammable Liquid. A liquid having a flash point below 100°F (37.8°C) and having a vapor pressure not exceeding 40 psi (276 kPa) absolute at 100°F (37.8°C) and shall be known as a Class I liquid.

Class I liquids shall be subdivided as follows:

- (a) Class IA shall include those having flash points below 73°F (22.8°C) and having a boiling point below 100°F (37.8°C).
- (b) Class IB shall include those having flash points below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C).
- (c) Class IC shall include those having flash points at or above 73°F (22.8°C) and below 100°F (37.8°C).

Flammable Liquid Storage Area. Area used for storage of Class I liquids.

Flash Point.* The minimum temperature at which a liquid emits vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid with the container as specified by appropriate test procedures and apparatus as follows:

The flash point of a liquid having a viscosity less than 45 Saybol + Universal seconds (SUS) at 100°F (37.8°C) or a flash point of 200°F (93.4°C) or higher shall be determined in accordance with ASTM D 56, *Standard Method of Test for Flash Point by the Tag Closed Cup Tester*.

The flash point of a liquid having a viscosity of 45 SUS or more at 100°F (37.8°C) or a flash point of 200°F (93.4°C) or higher shall be determined in accordance with ASTM D 93, *Standard Method of Test for Flash Point by the Pensky-Martens Closed Tester*.

Hand Hose Line System. A hose and nozzle assembly connected by fixed piping or connected directly to a supply of extinguishing agent.

Hydrant. A valved hose connection.

Inby. A mining term that means in the direction of the face of the mine or further into the mine.

Intrinsically Safe. Approved equipment incapable of releasing enough electrical or thermal energy under normal or abnormal conditions to cause ignition of a flammable mixture of methane or natural gas and air of the most easily ignitable composition.

Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Liquid. For the purpose of this document, any material with fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5, *Standard Method of Test for Penetration of Bituminous Materials*.

Listed.* Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.

Low Pressure Tank. A storage tank designed to withstand an internal pressure above 0.5 psig (3.5 kPa) but not more than 15 psig (102.4 kPa).

Mine Operator. The highest ranking person responsible for conduct of work at a mine.

Mobile Equipment. Wheeled, skid-mounted, track-mounted, or rail-mounted equipment capable of moving or being moved.

Noncombustible. Material that, in the form in which it is used under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat. Materials reported as noncombustible when tested in accordance with ASTM E 136, *Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, shall be considered noncombustible materials.

Operating Area. An area where mining of coal is taking place or area where construction is underway.

Outby. A mining term that means in the direction away from the face of the mine or toward the outside of the mine; opposite of inby.

Permissible Equipment. A completely assembled machine or accessory for which formal approval has been issued, allowing operation in a potentially explosive methane and air-mixture environment.

Pipeline System. An arrangement of piping, valves, connections, and allied equipment installed in a mine for the purpose of transporting, transferring, or dispensing flammable or combustible liquids.

Portable Extinguisher. A portable device carried or on wheels and operated by hand containing an extinguishing agent that can be expelled under pressure for the purpose of suppressing or extinguishing fire.

Portable Tank. Any closed vessel having a liquid capacity of over 60 gal (227 L), but less than 1000 gal (3785 L), and not intended for fixed installation.

Pressure Vessel. Any fired or unfired vessel within the scope of the applicable section of the ASME *Boiler and Pressure Vessel Code*.

Safety Can. An approved container, of not more than 5 gal (18.9 L) capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

Self-Closing Door. A door that, when opened and released, returns to the closed position.

Self-Propelled. Equipment that contains a motive power train as an integral part.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Standard. A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

Suitable. That which is appropriate and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

Tank. A closed vessel having a liquid capacity in excess of 60 gal (227 L).

Chapter 2 Fire Prevention

2-1 Housekeeping.

2-1.1 Maintenance and operating practices shall minimize leakage and prevent the accidental release of flammable or combustible liquids. Spillage shall not be allowed to accumulate in quantities that could create a fire hazard and shall be cleaned up promptly.

2-1.2 Where flammable or combustible liquids are used or handled, means shall be provided to dispose of leakage or spills safely.

2-1.3 Combustible material shall not be allowed to accumulate in nondesignated areas. Appropriate waste receptacles shall be provided for combustible refuse.

2-1.4 Routes designated for access to fire protection equipment shall be kept clear of obstructions.

2-1.5 Air volume and velocity shall be sufficient to dilute, render harmless, and carry away flammable or explosive concentrations of vapors.

2-1.6 Excessive amounts of coal dust shall be cleaned up, covered, or inerted with rock dust.

2-2 Cutting and Welding.

2-2.1 Cutting and welding shall be performed only by persons instructed in precautions and procedures for safe operation.

2-2.2 Cutting and welding equipment shall be maintained in good operating condition with all necessary safeguards in place and functioning.

2-2.2.1 Flashback and backflow preventers shall be installed at the outlets of all pressure regulators and on the hose connections used in cutting, welding, brazing, and soldering torches.

2-2.2.2 Manifolding of cylinders containing gases used for cutting and welding shall be permitted only in well-ventilated shops. The equipment shall be electrically grounded and maintained in accordance with the safety precautions provided by the manufacturer.

2-2.3 When transporting compressed gas cylinders for cutting or welding, they shall be as follows:

- (a) Disconnected from regulators

Exception: Cylinders, regulators, hose, and torches that are protected adequately against damage shall not be required to be disconnected during transport to prevent possible contamination of the system by coal dust and air.

- (b) Protected with a metal cap or headband (fence-type metal protector around the valve stem)
- (c) Secured by devices that will hold the cylinders in place during transit on conveyor belts or mobile or self-propelled equipment
- (d) Placed in electrically insulated, substantial containers designed to hold the cylinders during transit on a trolley wire haulage system
- (e) Clearly labeled “empty” or “MT” if the gas has been expended

2-2.4 Valves on unattended compressed gas cylinders shall be closed. Where located in other than underground shops, compressed gas cylinders not in use shall have the regulators removed, and the valves shall be protected by covering with protective metal caps, by tank design, or by other approved equivalent protection.

2-2.5 Compressed gas shall be used only for its intended purpose. Compressed oxygen shall not be used to blow coal dust from clothing or machinery.

2-2.6* Cutting or welding shall not be performed on or within containers or tanks that have stored combustible or flammable materials until such containers or tanks have been purged and cleaned thoroughly or have been inerted.

2-2.7 Cutting or welding shall not be performed within 50 ft (15.2 m), measured horizontally, of explosives, blasting agents, or flammable or combustible liquid storage areas unless separated by a suitable noncombustible barrier.

2-2.8 Before cutting and welding operations are undertaken, the following precautions shall be observed.

2-2.8.1 The immediate area shall be suitably cleaned, wetted down with water, or coated with rock dust. Open gear cases and combustible machine components located close to cutting or welding operations shall be covered with noncombustible material.

2-2.8.2* Fire extinguishing equipment including multipurpose (ABC) dry chemical extinguishers, rock dust, or water hose shall be within 25 ft (7.6 m) of the cutting or welding operation. In the case of a portable fire extinguisher, a single unit having a nominal capacity of 20 lb (9.1 kg) with a minimum rating of 4-A:40-B:C shall be within 25 ft (7.6 m) of the cutting or welding operation.

2-2.8.3 Tests for methane gas (CH₄) shall be made before cutting or welding in any area where methane gas is likely to be present. Subsequent tests shall be made to monitor changes in methane concentration during the cutting and welding operation. Cutting or welding shall not be allowed to begin or continue unless the concentration is less than 1 percent by volume.

2-2.8.3.1 Where cutting or welding is necessary in by the last open crosscut, a continuous fire watch shall be maintained.

2-2.8.3.2 Where in by equipment to be modified or repaired can be moved, it shall be moved out by the last open crosscut before cutting or welding.

2-2.8.4 Adequate ventilation shall be established prior to, and maintained during, cutting or welding.

2-2.8.4.1 Cutting or welding on equipment or within enclosed areas of the equipment shall not be performed in the presence of atmospheres containing flammable mixtures of gases, vapors, or liquids, or combustible mixtures of dust in suspension.

2-2.8.4.2 Flammable and combustible liquids shall not be dispensed within 50 ft (15.2 m) of cutting or welding operations. Freshly painted surfaces shall be allowed to dry sufficiently so that ignitable vapor is not present before cutting or welding.

2-2.8.5 Compressed gas cylinders shall be secured in the upright position or angled with the valve end higher for proper and safe operation during cutting and welding.

2-2.9 Compressed gas cylinders stored underground shall meet the requirements of this section.

2-2.9.1 Compressed gas cylinders shall be placed in storage areas designated for the purpose. These areas shall be constructed of noncombustible material or shall be well rock-dusted and free of trash and combustible or flammable liquids.

2-2.9.2 Compressed gas cylinders shall be stored and secured in an upright position or angled with the valve end elevated.

2-2.9.3 Compressed gas cylinders shall be protected against damage from falling material, contact with power lines and energized electrical machinery, and heat from cutting or welding operations.

2-2.9.4 The valves of the compressed gas cylinder shall be closed tightly and protected from physical damage when not in use.

2-2.9.5 Compressed gas cylinders shall not be stored or left unattended in the last open crosscut.

2-2.10 Upon completion of cutting or welding, a fire watch shall be maintained until all material has cooled sufficiently to allow touching with a bare hand.

2-2.10.1 Fire watchers shall have fire extinguishing equipment readily available and shall be trained in its use.

2-2.10.2 Fire watchers shall be familiar with the facilities and the procedures for sounding an alarm in the event of a fire.

2-3 Flammable Vapors. Precautions shall be taken to prevent the ignition of flammable vapors. Potential sources of ignition shall include, but are not limited to, the following:

- (a) Open flames
- (b) Smoking
- (c) Cutting and welding
- (d) Hot surfaces
- (e) Frictional heat
- (f) Static, electrical, and mechanical sparks
- (g) Spontaneous ignition, including heat-producing chemical reactions
- (h) Radiant heat

2-4 Underground Maintenance Shops.

2-4.1* Underground maintenance shops that are intended for use longer than 6 months shall be enclosed structures of fire-resistant construction, including floor, roof, roof supports, doors, and door frames, or shall be protected with an automatic fire suppression system. (*See Chapter 5 for information on fire suppression systems.*)

2-4.2 The shop area shall be ventilated directly to a return.

2-5* Belt Conveyors. Belt conveyors installed in underground coal mines shall, as a minimum, meet all the requirements of this section.

2-5.1 Conveyor belts shall be approved.

2-5.2 Entries in which belt conveyors are installed shall be kept reasonably free of accumulations of coal and coal dust and shall be rock-dusted as needed.

2-5.3 All belt conveyors shall be equipped with an approved slippage switch system designed to shut down the belt if slippage develops between the drive pulley(s) and the belt. On each new installation, the slippage switch system shall be tested before the conveyor is used for the transport of coal. Thereafter, the slippage switch system shall be tested weekly.

2-5.4 All conveyor belts shall be equipped with an approved interlock system that will shut down inby belt conveyors or other coal-feeding equipment if any conveyor in the system should stop or reduce its normal speed.

2-5.5* Fixed combustible material such as posts, cribbing, and roof supports shall be guarded from contact by the belt with noncombustible material or shall be located at least half the width of the belt from any idler or pulley. Guarding for machinery in the drive area and at other points along the belt shall be made of noncombustible material.

2-5.6 New belt conveyor installations shall use a support structure without a deck between the upper and lower belt flights.

Exception: Belts that carry the load of the belt on a low-friction metal deck without rollers.

2-6 Hydraulic Fluids.

2-6.1 Fire-resistant hydraulic fluid shall be approved.

2-6.2 Unattended hydraulic equipment shall employ fire-resistant hydraulic fluid unless protected by an automatic fire suppression system.

2-6.3 Where fire-resistant fluids are required, samples of in-use fire-resistant fluids of the invert emulsion-type shall be collected quarterly. These samples shall be tested individually to determine if the water content will make the fluid fire resistant. When a sample indicates that the water content is insufficient for the fluid to be fire resistant, the fluid shall be replaced or water shall be added to restore the fire resistance of the fluid. When water is added to the hydraulic system of any machine, a sample shall be taken and analyzed within 24 hours.

2-7 Risk Management.

2-7.1* Fire Risk Assessment.

2-7.1.1 A fire risk assessment shall be performed on all electrical or diesel-powered fixed, mobile, and self-propelled equipment by the mine operator or the operator's designated agent. This assessment shall include evaluation of the risk potential for the start and spread of a fire and the generation of smoke, gases, or toxic fumes that could endanger the lives and safety of personnel or cause unacceptable damage to property.

2-7.1.2 A separate fire risk assessment for each piece of equipment shall be required only when variations in design, use, condition, and environment change the fire potential.

2-7.1.3 If the assessment identifies unacceptable risks, further assessment shall include an evaluation of each of the following:

- (a) Methods for minimizing or eliminating existing hazardous fire conditions
- (b) Use of detection and early fire-warning devices

- (c) Normal and emergency means of egress from the equipment or areas and evacuation to a safe location
- (d) Compartmentalization of equipment or isolation of areas to prevent or contain the spread of fire
- (e) Availability of fire-fighting personnel and existing fire suppression equipment
- (f) Spread of equipment fire to combustible materials in proximity
- (g) Ventilation control structures to contain or redirect products of combustion to the return
- (h) Any other devices or procedures necessary to protect life and property

2-7.2 Fire Risk Reduction. Fire risk reduction practices shall follow the principles of minimizing ignition sources and reducing exposure of combustible materials to ignition sources. Paragraphs 2-7.2.1.1 and 2-7.2.2 delineate risk reduction practices.

2-7.2.1 Equipment Modification.

2-7.2.1.1* All equipment shall be analyzed to determine whether fire risks can be reduced through equipment modification. Some examples include physical barriers between fuel and ignition sources, thermal shields over hot surfaces, hydraulic hose and electrical wiring harness rerouting, and power shutoffs.

2-7.2.1.2 Modifications affecting fire risk of equipment shall be analyzed to determine whether such modifications decrease or increase fire risk.

2-7.2.2 Equipment, Inspection, and Maintenance. Hydraulic lines, coolant lines, lubrication lines, fuel lines, and electrical wiring, mechanical components, and fire prevention devices shall be inspected and maintained in proper condition in accordance with the manufacturers' recommendations.

Chapter 3 Flammable Liquids

3-1 General.

3-1.1 Wherever possible, the underground storage of flammable liquids shall be minimized.

3-1.2* Electrical equipment in flammable liquid storage areas shall be Class I, Division 1 as specified in NFPA 70, *National Electrical Code*®, or shall be classified "permissible" electrical equipment.

3-1.3 Flammable liquids in storage shall be kept in closed containers.

3-1.4 Flammable liquids shall be permitted to be used only where there are no open flames or other sources of ignition within the possible path of vapor travel in flammable concentrations.

3-1.5 Flammable liquid containers shall be returned to a flammable liquid storage area after use.

3-1.6 All aerosol cans shall be treated as containing flammable liquids unless otherwise specifically identified.

3-1.7 Individual aerosol cans that are used regularly in normal operations shall be permitted on mobile equipment or in tool cabinets. Such cans shall be protected from mechanical damage.

3-2 Flammable Liquid Containers.

3-2.1 Flammable paints shall be stored only in original containers or cans of not over 5 gal (3.8 L) capacity. All other flammable liquids shall be transferred while on the surface to a listed safety can.

3-2.2 Safety cans containing Class IA flammable liquids shall not exceed 2 gal (7.6 L) capacity.

3-2.3 All flammable liquid containers shall be clearly labeled with the word "flammable."

3-2.4 Flammable liquid containers shall be stored in a stable manner.

3-3 Flammable Liquid Storage Areas.

3-3.1 Flammable liquids shall be stored in noncombustible cabinets or areas specifically designed and constructed for such purpose.

3-3.1.1 Noncombustible storage cabinets shall be listed or approved, or shall meet the requirements specified in Section 4-3 of NFPA 30, *Flammable and Combustible Liquids Code*.

3-3.1.2 Flammable liquid storage areas shall meet the requirements of 4-5.1, 4-5.2, and 4-5.5.

3-3.2 In operating areas, containers of flammable liquids and aerosol cans shall be stored at least 25 ft (7.6 m) away from potential ignition sources such as energized trolley wire, energized electrical equipment, and other operating equipment.

3-3.3 The aggregate quantity of flammable liquids, including aerosol cans, in a flammable liquid storage area shall not exceed 60 gal (227 L).

3-4 Dispensing Flammable Liquids.

3-4.1 Flammable liquids shall be drawn from or transferred into containers within a storage area using only the following methods:

- (a) From safety cans
- (b) From a container by means of a device that draws through an opening in the top of the container
- (c) By gravity through a listed or approved self-closing valve or self-closing faucet

3-4.2 Transferring flammable liquids by means of pressurizing a container with air shall be prohibited. Transferring flammable liquids by pressure of inert gas shall be permitted only if controls, including pressure relief devices, are provided to limit the pressure so it cannot exceed the design pressure of the container.

3-4.3 Where electrically powered pumps are used to transfer flammable liquids, a clearly identified and accessible switch or circuit breaker shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.

3-4.4 Where flammable liquids are dispensed from containers, the containers shall be provided with approved vents, bonding, and flame arresters.

3-4.5 At least one portable fire extinguisher having a nominal capacity of 20 lb (9.1 kg) with a minimum rating of 10-A:60-B:C shall be located not more than 40 ft (12.2 m) from any area where flammable liquid is dispensed.