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NFPA 51A Acetylene Cylinder Charging Plants 1989 Edition

National Fire Protection Association Batterymarch Park, Quincy, MA 02269

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

Statement on NFPA Procedures

This material has been developed under the published procedures of the National Fire Protection Association, which are designed to assure the appointment of technically competent Committees having balanced representation. While these procedures assure the highest degree of care, neither the National Fire Protection Association, its members, nor those participating in its activities accepts any liability resulting from compliance or noncompliance with the provisions given herein, for any restrictions imposed on materials or processes, or for the completeness of the text.

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NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 51A

Standard for

Acetylene Cylinder Charging Plants

1989 Edition

This edition of NFPA 51A, *Standard for Acetylene Cylinder Charging Plants*, was prepared by the Technical Committee on Industrial and Medical Gases, and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 14-17, 1988 in Nashville, Tennessee. It was issued by the Standards Council on January 13, 1989, with an effective date of February 6, 1989, and supersedes all previous editions.

The 1989 edition of this document has been approved by the American National Standards Institute.

Origin and Development of NFPA 51A

Although acetylene cylinder charging plants have been built and operated for several decades, a limited number of concerns were involved and these possessed a high degree of design and operating capability. As a result, fire experience was good and there was no need for national standard guidance.

In recent years, a number of other firms have entered this industry and the need for a national standard became evident. Work on this standard was initiated and its subsequent promulgation materially assisted by a Committee of the Compressed Gas Association, Inc., which submitted a text to the NFPA Committee on Industrial and Medical Gases.

This standard was adopted as a tentative standard in 1970. Amended editions were adopted in 1971, 1973, 1974, 1979, and 1984. This 1989 edition reconfirms the 1984 edition.

Technical Committee on Industrial and Medical Gases

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred

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.

Contents

NFPA 51A

Standard for

Acetylene Cylinder Charging Plants

1989 Edition

Chapter 1 Introduction

1-1 Purpose. This standard is intended to provide safety requirements for the design, construction, and installation of acetylene cylinder charging plants in order to provide safeguards for the protection of the plant, its employees, and the public.

1-2 Scope.

1-2.1 This standard applies to plants which are engaged in the generation and compression of acetylene and in the charging of acetylene cylinders, either as their sole operation or in conjunction with facilities for charging other compressed gas cylinders.

1-2.2 An existing plant which is not in strict compliance with the provisions of this standard may be continued in use when such use does not constitute a distinct hazard to life or adjoining property.

1-2.3 This standard does not apply to plants which only produce and compress acetylene for chemical operations or to plants which only produce and compress acetylene below 15 psig (103 kPa). (Refer to NFPA 51 for acetylene generating plants where the acetylene is used with oxygen for welding, cutting, heating, and heat-treating operations.)

1-3 Definitions.

1-3.1 For the purposes of this standard the following definitions shall apply:

Acetylene Operations. Includes acetylene generation, storage, purification, compression, cylinder filling, cylinder storage, and calcium carbide storage.

Approved. Acceptable to the "authority having jurisdiction."

NOTE: The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner since jurisdictions and "approval" agencies vary as do their responsibilities. Where public safety is primary, the "authority having jurisdiction" may be a federal, state, local or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority having jurisdiction." In many circumstances the property owner or his designated agent assumes the role of the "authority having jurisdiction"; at government installations, the commanding officer or departmental official may be the "authority having jurisdiction."

Limited-Combustible Material. A type of building construction material as defined in NFPA 220, *Standard on Types of Building Construction.*

Listed. Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Mobile Acetylene Trailer System. A manifolded group of cylinders held together as a unit on a transport vehicle for the purpose of containing and transporting large quantities of acetylene. This system includes the mobile acetylene trailer, pressure regulator(s), flash arrestors, protective devices, meter (optional), and interconnecting piping. The system terminates at the point where acetylene at service pressure enters the user's piping system.

Noncombustible Material (as defined in NFPA 220, *Standard on Types of Building Construction*). A material which, in the form in which it is used and 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, *Standard Method of Test for Behavior of Materials in a Vertical Tube Furnace at 750 °C,* shall be considered noncombustible materials.

Plant. A facility engaged in the generation and compression of acetylene and in the filling of acetylene cylinders either as its sole operation or in conjunction with facilities for filling other compressed gas cylinders.

Psig. Pressure in pounds per square inch gage.

Shall. Indicates a mandatory requirement.

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

Unpierced Wall. A wall which may have pipes or conduits passing through it; or windows, glazed with safety glass or wired glass, set in it; but such openings must be sealed to prevent the flow of air between adjacent rooms.

Chapter 2 Plant Location, Arrangement, Construction, and Utilities

2-1 Location.

2-1.1 Portions of plants housing acetylene charging and acetylene cylinder storage operations shall be located at least 50 ft (15 m) from public right-of-way and from lines of adjoining property that may be built upon. A lesser distance is acceptable if suitable fire barriers are provided.

2-1.2 If plants are located in heavily populated or congested areas, the authority having jurisdiction shall determine appropriate distance requirements, barriers, or other protective measures.

2-2 Arrangement.

2-2.1 Portions of plants housing acetylene operations may be used for charging of other gases provided that oxidizing gas operations are located at least 20 ft (6 m) from flammable gas operations. However, charging of oxidizing gas cylinders or storage of such filled cylinders may be separated from charging or storage of flammable gas cylinders by a masonry wall at least 5 ft (1.5 m) high having a fire resistance rating of at least 1 hour. For purposes of this standard, air is not considered an oxidizing gas.

2-2.2 Portions of plants housing acetylene operations shall be separated by unpierced walls from other portions of the plant which do not meet the provisions of this standard applicable to acetylene operations. In existing plants only, walls of rooms housing activities associated with the acetylene operations, such as locker rooms, offices, and maintenance rooms, are permitted to be pierced with doorways if these are provided with self-closing doors. If either the construction or the occupancy of the nonacetylene operation portions of the plant are combustible, the common wall shall be constructed of noncombustible or limited-combustible materials and have a fire-resistance rating of at least 1 hour.

2-2.3 Acetylene cylinder charging plants constructed subsequent to May 19, 1971, shall have neither floors above nor basements beneath the cylinder charging area. Floors above or basements beneath cylinder charging areas in plants constructed prior to May 19, 1971, shall not be used.

2-2.4 The property on which the plant and carbide-residue pond are located shall be suitably posted or fenced or guarded to discourage the entrance of unauthorized persons.

2-3 Construction.

2-3.1 Walls, partitions, and roofs of buildings in which acetylene operations are conducted shall be constructed of noncombustible or limited-combustible materials.

2-3.2 Buildings or rooms housing acetylene operations, excluding calcium carbide storage rooms, shall be of explosion-damage-limiting construction and shall have an explosion venting area of not less than 1 sq ft (0.09 m^2) per 50 cu ft (1.4 m^3) of room volume.

2-3.3 Exits shall be provided in accordance with NFPA *101®*, *Life Safety Code®*. Areas housing acetylene operations shall be considered as "high hazard industrial occupancies" in the application of NFPA *101*.

2-4 Ventilation.

2-4.1 Rooms housing acetylene operations, excluding calcium carbide storage rooms (*see 3-2.7*), shall be ventilated at a rate of not less than 1 cu ft (0.03 m^3) per min per sq ft (0.09 m^2) of ceiling area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Inlet openings shall be located near the floor. Outlet openings shall be located at the high point of the room. Provision shall be made for introduction of make-up air in such a manner as not to short-circuit the ventilation. If operations involving heavier-than-air flammable gases are conducted in a room housing acetylene operations, special consideration shall be given to ventilation at the operation involving heavier-than-air gases.

2-5 Heating.

2-5.1 Heating equipment shall be of the steam or hot water types.

2-5.2 Boilers, water heaters, and other heating equipment employing flames or capable of creating sparks shall be located in a separate building or room not directly communicating with areas devoted to acetylene operations.

2-5.3 Buildings or rooms devoted to acetylene operations, excluding calcium carbide storage rooms and cylinder storage areas, shall be maintained at a temperature above 40 °F (4.4 °C) during time of operation.

2-6 Electrical Equipment.

2-6.1 Rooms containing electrical equipment and wiring not conforming with 2-6.2 shall be separated from acetylene operations by an unpierced wall. In existing plants only, walls of rooms housing activities associated with the acetylene operations, such as locker rooms, offices, and maintenance rooms, are permitted to be pierced with doorways if these are provided with self-closing doors.

2-6.2 Electrical equipment and wiring in rooms housing acetylene operations, except rooms used exclusively for calcium carbide storage, shall conform to NFPA 70, *National Electrical Code®*, Article 501, for Class I, Division 2 locations. Class I, Groups C or D electrical equipment may be installed if located more than 5 ft (1.5 m) from charging openings of generator hoppers, acetylene manifolds, liquid seals, and drain line outlets. If operations involving hydrogen are conducted in a room housing acetylene operations, special consideration shall be given to electrical equipment at these operations.

2-6.3 A readily accessible emergency electrical shutdown switch shall be provided.

Chapter 3 Calcium Carbide

3-1 Drums and Containers.

3-1.1 Calcium carbide shall be stored in metal containers of sufficient strength to ensure handling without rupture. The containers shall be constructed so as to be watertight under normal handling conditions.

3-1.2 Containers for calcium carbide shall be conspicuously marked: CALCIUM CARBIDE — DANGEROUS IF NOT KEPT DRY, or equivalent wording.

3-2 Storage Areas.

3-2.1 Calcium carbide storage areas shall not be used for the storage of flammable materials or flammable compressed gases.

3-2.2 Each area of the plant in which calcium carbide is handled, stored, or used shall be conspicuously posted with notices reading: CALCIUM CARBIDE — DANGEROUS IF NOT KEPT DRY — KEEP WATER AND FLAMES AWAY, or equivalent wording.

3-2.3 Calcium carbide storage areas shall be arranged so that any defective container can be removed within a reasonable period of time.

3-2.4 Calcium carbide containers shall be supported in a suitable manner so that the container will not come in contact with the ground or with ground water.

3-2.5 Calcium carbide storage shall be located at least 10 ft (3 m) from any line of adjoining property that may be built upon.

3-2.6 Exposed water, steam, or condensate lines shall not be permitted in rooms or buildings devoted exclusively to calcium carbide storage in drums. Unopened bulk carbide containers which have accumulations of ice and snow are permitted to be stored in such rooms or buildings.

3-2.7 Storage of calcium carbide inside buildings shall be in a dry, waterproof, and well-ventilated location.

Chapter 4 Acetylene Generators and Calcium Carbide Residue

4-1 Design.

4-1.1 This section is not intended to govern the design of acetylene generators because of the many variable and complex design features of different types of generators. Generators shall be designed by competent experienced persons familiar with the chemical and physical properties of acetylene and calcium carbide and with the fundamentals of pressure-vessel design.

4-2 Installation.

4-2.1 Acetylene generators shall be installed within a room or building not exceeding a height of one story, except that a two-story building is permissible provided that the second story is used only for charging the generators with calcium carbide. Outdoor installations are permitted when protected from rain and freezing.

4-2.2 The foundation under a generator shall be so arranged that the generator will be level and no excessive strain will be placed on the generator or its connections.

4-2.3 If water is supplied to the generator through a continuous connection, means shall be provided on the generator to prevent overfilling. Such a connection shall also be equipped with means to prevent the backflow of acetylene from the generator into the water supply.

4-3 Venting of Generator.

4-3.1 Each generator shall be provided with adequate pressure relief devices to prevent pressures in excess of the allowable pressure rating of the generator. The relief vent piping shall be substantially installed without traps and in such a manner that condensation will not accumulate in the vent piping.

4-3.2 The maximum permissible generating pressure is 15 psig (103 kPa). The maximum pressure setting of the generator pressure relief devices shall be 18 psig (124 kPa).

4-3.3 The vent pipes shall be full size to the termination point outside of the building and shall terminate in a hood or bend directed to a safe location. The hoods or bends shall be located at least 12 ft (3.6 m) above the ground, at least 3 ft (0.9 m) from combustible construction and as far as practicable from building openings and sources of ignition. The hood or bend shall be constructed so that it will not be obstructed by rain, snow, ice, insects, or birds.

4-3.4 Generator chamber relief pipes shall not be interconnected but shall be led separately to the outdoors. This requirement does not prohibit connecting two pressure relief device vents protecting the same section of a generator from connecting to a common vent.

4-4 Operating Instructions.

4-4.1 Generator operating instructions shall be displayed in a conspicuous place near the generator or otherwise kept convenient for ready reference by the operator.

4-5 Calcium Carbide Residue Disposal.

4-5.1 Acetylene generators shall not be fitted with continuous drain connections leading to sewers. Calcium carbide residue shall be discharged into outdoor open sump pits or other ventilated receptacles. Such receptacles may have a clear-water connection to public sewers if such disposal means is approved by local authorities.

4-5.2 The point of discharge of calcium carbide residue from acetylene generators into sump pits and other receptacles shall be located outdoors or in well-ventilated areas and at least 15 ft (4.5 m) from sources of ignition and the line of adjoining property which may be built upon.

4-5.3 All calcium carbide residue pits and ponds shall be within an area fenced or posted around their perimeters

with conspicuous signs reading: NO TRESPASSING — NO SMOKING OR OPEN FLAMES, or equivalent wording.

Chapter 5 Acetylene Gasholders, Purifiers, and Low Pressure Driers

5-1 Location of Gasholder.

5-1.1 Gasholders may be located outdoors or inside of buildings.

5-1.2 The gasholder shall be located at least 50 ft (15 m) from concentrations of people and any flammable liquid or flammable gas storage and at least 25 ft (7.5 m) from any source of ignition, line of adjoining property which may be built upon, or public way.

5-1.3 Indoor gasholders shall be located in a room which complies with the requirements of Chapter 2 of this standard. This room may house other acetylene equipment.

5-2 Installation of Gasholder.

5-2.1 The gasholder shall be equipped with inlet and outlet shutoff valves located so that they can be closed readily in an emergency.

5-2.2 The gasholder shall not be exposed to electric power lines, flammable liquid lines, or flammable gas lines.

5-2.3 Weeds and grass within 25 ft (7.5 m) of the gasholder shall be kept cut and cuttings removed. Combustible material shall not be permitted within 25 ft (7.5 m) of the gasholder.

5-2.4 The gasholder shall be conspicuously marked: ACETYLENE — FLAMMABLE GAS — DANGER — KEEP FIRE AND OPEN FLAMES AWAY, or equivalent wording.

5-3 Low Pressure Purifiers and Driers.

5-3.1 Purifiers and driers shall be provided with inlet and outlet shutoff valves so located that they can be closed in an emergency.

Chapter 6 Acetylene Compressors and High Pressure Driers

6-1 Installation.

6-1.1 The inlet and outlet piping of each compressor shall be provided with readily accessible shutoff valves that can be closed in an emergency.

6-1.2 Drain lines from high pressure [above 15 psig (103 kPa)] oil separators, condensate traps, and driers shall be piped outdoors to a safe location away from any source of ignition and combustible material. Drain lines from medium pressure [15 psig (103 kPa) and lower] systems, where the effluent water is visible to the operator from the drain valve location, are permitted to be piped to an indoor drain.

6-1.3 The pressure relief valve vent pipes shall be full size to the termination point outside of the building and shall terminate in a hood or bend directed to a safe location. The hoods or bends shall be located at least 12 ft (3.6 m) above the ground, at least 3 ft (0.9 m) from combustible construction, and as far as practicable from building openings and sources of ignition. The hood or bend shall be constructed so that it will not be obstructed by rain, snow, ice, or birds.

6-1.4 The suction line to the compressor shall be provided with a pressure switch or equivalent device capable of shutting down the compressor when the suction pressure falls below a pressure not less than 1 in. of water column (0.25 kPa) above atmospheric pressure. A shutoff valve shall not be installed between the compressor and the pressure switch or equivalent device.

6-1.5 The discharge line from the compressor shall be provided with a pressure switch to shut down the compressor when the discharge pressure reaches the maximum permissible operating pressure of the system, but in no case more than 400 psig (2.8 MPa). Any valve installed between the compressor and the pressure switch shall be provided with a positive lock-open device.

6-2 Design.

6-2.1 Compressors shall be specifically designed and constructed for acetylene service.

6-2.2 Compressors shall be constructed so that the acetylene is cooled during and after each stage of compression. When water is used, the flow of water from the cooling jackets and intercoolers shall be visible to the operator.

6-2.3 A pressure gage shall be provided on the discharge piping following each stage of compression and a temperature indicator shall be provided on the final discharge piping.

6-2.4 A pressure relief device shall be provided on the discharge piping following each stage of compression. There shall be no shutoff valve between the relief device and the compressor piping.

6-2.5 Transmission belts when used in compressor rooms shall be provided with static eliminators or be of the static-conducting type.

Chapter 7 Acetylene Piping

7-1 General.

7-1.1 Acetylene piping shall be identified in accordance with ANSI A13.1, *Scheme for Identification of Piping Systems.*

7-1.2 Acetylene piping shall be braced and supported to avoid excessive strains and vibrations.

7-1.3 Pipe fittings shall conform to the requirements of 10-1.1, 10-1.2, and 10-1.3.

7-2 Piping for Pressure not Exceeding 15 Psig (103 kPa).

7-2.1 Piping and fittings shall be steel, wrought iron, malleable iron, or copper alloys meeting the requirements of 10-1.2.

7-2.2 For nominal pipe size 6 in. (0.23 m) and less, all pipe shall be a minimum of Schedule 40, and all pipe fittings shall have a minimum rating of 125 psig (861 kPa).

7-2.3 Piping shall be gas leak tested to at least 150 percent of the maximum operating pressure using inert gas or air as the test medium.

7-3 Piping for Pressure Exceeding 15 Psig (103 kPa).

7-3.1 Piping shall be steel or wrought iron, and fittings shall be steel, malleable iron, ductile iron, or copper alloys meeting the requirements of 10-1.2.

7-3.2 All pipe of nominal size 1 in. (25 mm) and less shall be at least Schedule 80.

7-3.3 All pipe of nominal sizes 1¼ in. and 1½ in. (32 mm and 86 mm) shall be at least Schedule 160.

7-3.4 All pipe fittings shall have a minimum working pressure of 3,000 psig (20.7 MPa).

7-3.5 Pressure gage Bourdon tubes shall preferably be steel but may be copper alloys meeting the requirements of 10-1.2.

7-3.6 Piping shall be hydrostatically tested at 4,500 psig (31 MPa). Pressure relief valves, pressure gages, diaphragm valves, regulators, and flash arresters are exempted from this provision.

7-4 Cylinder Charging Leads.

7-4.1 Cylinder charging leads shall have a minimum burst rating of 10,000 psig (69 MPa) and shall be constructed of metallic or nonmetallic materials suitable for use in acetylene service.

Chapter 8 Acetylene Cylinder Charging Manifolds, Acetoning Equipment, and Mobile Acetylene Trailer Systems

8-1 General.

8-1.1 Each cylinder charging manifold shall be provided with a shutoff valve and a blow-down valve vented to the outdoors or to the low pressure system.

8-1.2 A check valve shall be installed in the pipeline at each cylinder charging manifold or in each cylinder charging lead.

8-1.3 Each cylinder charging manifold shall be provided with a pressure gage located downstream of the shutoff valve.

8-1.4 Each cylinder charging manifold outlet shall be provided with a shutoff valve.

8-1.5 Cylinder charging manifolds shall be arranged so that excessive stress in the cylinder charging leads is prevented.

8-1.6 Acetylene cylinders which have provision for caps need not have caps in place when in the acetylene cylinder charging plant.

8-2 Acetoning Equipment.

8-2.1 Acetone storage containers shall be constructed and installed in accordance with NFPA 30, *Flammable and Combustible Liquids Code.* Aboveground acetone storage containers in excess of one 55-gal (208-L) drum shall be located at least 25 ft (7.6 m) from the storage of acetylene cylinders and other flammable gas cylinders.

8-3 Charging Procedures.

8-3.1 To prevent liquefaction (condensation) of acetylene, its pressure shall not exceed the following values for the corresponding acetylene temperatures.

Temperature		Pressure	
(°F)	(°C)	(Psig)	(MPa)
− 5	(− 20.5)	200	(1.4)
0	(− 17.8)	220	(1.5)
10	(− 12.2)	260	(1.8)
20	(− 6.7)	305	(2.1)
30	(− 1.1)	360	(2.5)
37	(2.8) (and above)	400	(2.8)

8-3.2 Valves for charging cylinders shall be operated in such a sequence that the cylinder valves are opened first at the start of charging operations and closed last at the end of charging operations.

8-4 Cylinder Cooling Systems.

8-4.1 Acetylene cylinders connected to charging manifolds shall be cooled by water spray applied from a manually activated spray nozzle system, when needed for removing heat of solution of acetylene, as determined by ambient temperature and cylinder charging rate.

8-5 Cylinder Storage.

8-5.1 Charged cylinders shall be preferably stored outside the charging room. If stored in the charging room, they shall be located as far as practicable from the charging manifolds.

8-6 Mobile Acetylene Trailer Systems.

8-6.1 The mobile acetylene trailer system and charging of the trailer system shall comply with CGA Pamphlet G-1.6, *Recommended Practices for Mobile Acetylene Trailer Systems.*

Chapter 9 Fire Prevention and Protection

The major fire hazard in the acetylene plant is that of acetylene gas escaping from equipment, piping, or cylinder fittings. The gas may or may not ignite. In either case, every attempt consistent with personnel safety is normally made to shut off or remove the source of escaping gas. Fire is not normally extinguished in any other way, but some fires in leaking acetylene or acetone have been extinguished with hose water or hand extinguishers when the source of escaping fuel was small enough so that it did not present a reignition hazard, or the source was removed safely and promptly to a safe location. When a fire has exposed acetylene cylinders, the cylinders have been kept cool by application of water to protect the cylinders and prevent undue release of acetylene through the cylinder safety devices.

9-1 Fire Prevention.

9-1.1 Acetylene cylinder shipping and receiving docks and plant entrances shall be posted with a readily visible sign reading: SMOKING STRICTLY PROHIBITED, or equivalent wording.

9-1.2 Self-closing metal waste receptacles shall be provided for greasy, oily rags and similar waste materials.

9-1.3 Exits and fire protection equipment shall not be blocked or obstructed in any manner.

9-2 Fire Protection.

9-2.1 Plant areas devoted to acetylene compression, purification, acetylene cylinder charging, acetylene cylinder storage, and other areas housing acetylene operations (but where calcium carbide is not stored) shall be protected by one or more 1½-in. (38-mm) hose stations equipped with an adequate length of hose. Hoses shall be equipped with combination spray and solid stream nozzles.

9-2.2 The need for automatic water spray system protection for acetylene cylinder charging manifolds shall be determined by an analysis of local conditions of hazard within the plant, exposure to other properties, water supplies, the probable effectiveness of plant fire brigades, and the time of response and probable effectiveness of fire departments. Where automatic water spray systems are installed, NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, shall be used as a guide. Automatic actuation may be by means of fusible links. Water coverage shall be not less than 0.25 gpm (0.02 L/s) per sq ft (0.09 m^2) of floor area directly wetted by the system. An extra hazard open or closed head sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, is an acceptable alternate.

9-2.3 If local conditions warrant (*see 9-2.2*), one of the types of fixed water protection systems specified in 9-2.2 shall be provided over filled cylinder storage.

9-2.4 The plant areas devoted to calcium carbide storage and handling and to acetylene generation shall be provided with an adequate supply of dry sand or a sufficient number of dry chemical or carbon dioxide fire extinguishers.

9-2.5 Fire protection equipment shall be conspicuously identified and located so that it is readily visible and accessible in an emergency. Fire hoses and sprinkler actuation valves shall be located so that they can be operated from outdoors or at an exit.

9-2.6 Each plant shall have a written emergency procedure and shall conduct periodic fire drills. Where plant buildings are widely separated, consideration shall be given to providing an audible alarm for summoning plant personnel in an emergency.

Chapter 10 General Provisions

10-1 General Provisions.

10-1.1 Unalloyed copper, silver, or mercury shall not be used where they may be exposed to acetylene or to liquids containing acetylene in solution.

10-1.2 Copper alloys containing more than 65 percent copper shall not be used where they may be exposed to acetylene, unless such alloys have been found to be safe in the specific application by experience or by test.

10-1.3 All major equipment and piping (generators, compressors, and manifolds) employed in acetylene operations shall be electrically continuous and bonded to any grounding electrode, as defined by NFPA 70, *National Electrical Code.*

10-1.4 Generators, compressors, and pressure relief devices shall be plainly marked with their capacities, pressure ratings, the manufacturer's name and address, and the model or serial numbers. The capacity and operating pressure of this equipment shall not exceed the rating for which it is designed.

Chapter 11 Referenced Publications

11-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

11-1.1 NFPA Publications. National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 13-1989, *Standard for the Installation of Sprinkler Systems*

NFPA 15-1985, *Standard for Water Spray Fixed Systems for Fire Protection*

NFPA 30-1987, *Flammable and Combustible Liquids Code*

NFPA 70-1987, *National Electrical Code*

NFPA *101*-1988, *Life Safety Code*

NFPA 220-1985, *Standard on Types of Building Construction.*

11-1.2 Other Publications.

ANSI A13.1-1981, *Scheme for Identification of Piping Systems*, American National Standards Institute, 1430 Broadway, New York, NY 10018.

ASTM E-136-1982, *Standard Method of Test for Behavior of Materials in a Vertical Tube Furnace at 750 °C*, American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103.

CGA Pamphlet G-1.6-1981, *Recommended Practices for Mobile Acetylene Trailer Systems*, Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

Appendix A Referenced Publications

A-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

A-1-1 NFPA Publications. National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 51-1987, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes.*

A-1-2 CGA Publications. The following publications are available from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

CGA Pamphlet C-2-1987, *Recommendations for the Disposition of Unserviceable Compressed Gas Cylinders*

CGA Pamphlet G-1-1972, *Acetylene.*

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SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

INSTRUCTIONS

Please use the forms which follow for submitting proposed amendments. Use a separate form for each proposal.

1. For each document on which you are proposing amendment indicate:
   (a) The number and title of the document
   (b) The specific section or paragraph.

2. Check the box indicating whether or not this proposal recommends new text, revised text, or to delete text.

3. In the space identified as "Proposal" include the wording you propose as new or revised text, or indicate if you wish to delete text.

4. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If a statement is more than 200 words in length, the technical committee is authorized to abstract it for the Technical Committee Report.

5. Check the box indicating whether or not this proposal is original material, and if it is not, indicate source.

6. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council
National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269

Date 5/18/85 Name John B. Smith Tel. No. 617-555-1212

Address 9 Seattle St., Seattle, WA 02255

Representing (Please indicate organization, company or self) Fire Marshals Assn. of North America

1. a) Document Title: Protective Signaling Systems NFPA No. & Year NFPA 72D

   b) Section/Paragraph: 2-7.1 (Exception)

2. Proposal recommends: (Check one) ☐ new text
   ☐ revised text
   ☒ deleted text.

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

   Delete exception.

4. Statement of Problem and Substantiation for Proposal:

   A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ This Proposal is original material.
   ☐ This Proposal is not original material; its source (if known) is as follows: _____

(Note Original material is considered to be the submitter's own idea based on or as a result of his own experience, thought, or research and, to the best of his knowledge, is not copied from another source.)

I agree to give NFPA all and full rights, including rights of copyright, in this Proposal and I understand that I acquire no rights in any publication of NFPA in which this Proposal in this or another similar or analogous form is used.

John B. Smith

Signature

PLEASE USE SEPARATE FORM FOR EACH PROPOSAL

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council
National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269

Date _____ Name _____ Tel. No. _____

Address _____

Representing (Please indicate organization, company or self) _____

1. a) Document Title: _____ NFPA No. & Year _____

   b) Section/Paragraph: _____

2. Proposal recommends: (Check one) ☐ new text
   ☐ revised text
   ☐ deleted text.

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

4. Statement of Problem and Substantiation for Proposal:

5. ☐ This Proposal is original material.
   ☐ This Proposal is not original material; its source (if known) is as follows: _____

(Note: Original material is considered to be the submitter's own idea based on or as a result of his own experience, thought, or research and, to the best of his knowledge, is not copied from another source.)

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Signature

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