

51A

NFPA 51A

Standard for

Acetylene Cylinder

Charging Plants

1996 Edition



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

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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.

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Tentative Interim Amendment

NFPA 51A

Standard for Acetylene Cylinder Charging Plants

1996 Edition

Reference: 3-1.1
TIA 96-1 (NFPA 51A)

Pursuant to Section 4 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 51A, *Standard for Acetylene Cylinder Charging Plants*, 1996 edition. The TIA was processed by the Industrial and Medical Gases Committee, and was issued by the Standards Council on January 15, 1997, with an effective date of February 4, 1997.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise 3-1.1 to read as follows:

3-1.1 Calcium carbide shall be stored in packages meeting Department of Transportation or Transport Canada regulations.

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NFPA 51A
Standard for
Acetylene Cylinder Charging Plants
1996 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 13-15, 1995, in Chicago, IL. It was issued by the Standards Council on January 12, 1996, with an effective date of February 2, 1996, 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 51A was approved as an American National Standard on February 2, 1996.

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, 1984, 1989, and 1996.

Technical Committee on Industrial and Medical Gases

Charles B. Henrici, *Chair*
River Forest Fire Dept., IL
Rep. Int'l Assn. of Fire Chiefs

Theodore C. Lemoff, *Secretary*
Nat'l Fire Protection Assn., MA

Francis X. Bender, Safety Engr Consultants, NJ
Carl A. Caves, U.S. Dept. of Energy, MD
Marshall Issen, Underwriters Laboratories Inc., IL
Dennis J. Murray, KMS-Medical Gas System Consultants Ltd, MI
Rep. American Hospital Assn.
Douglas F. Nelson, Industrial Risk Insurers, PA
Rep. Industrial Risk Insurers
John T. Pavlovcak, Air Products & Chemicals, Inc., PA
Rep. Compressed Gas Assn.

Samir Shiban, Intel Corp., OR
David Simon, Air Liquide America Corp., TX
Rep. Compressed Gas Assn.
Michael W. St Clair, The Ohio State University, OH
Rep. NFPA Industrial Fire Protection Section
Gregory Stockinger, Wallace & Tiernan, Inc., NJ
Rep. The Chlorine Inst.
Lionel Wolpert, Airco Industrial Gases, NJ
Rep. Compressed Gas Assn.

Alternates

Joseph Macko, The BOC Group, NJ
(Alt. to L. Wolpert)
Jason J. Raasch, Underwriters Laboratories Inc., IL
(Alt. to M. Issen)

William A. Thornberg, Industrial Risk Insurers, CT
(Alt. to D. F. Nelson)
Gary F. Trojak, Chlorine Inst. Inc., DC
(Alt. to G. Stockinger)

Nonvoting

Wendell Glasier, U.S. Dept. of Labor OSHA, DC
(Alt. to J. Slattery)
Fred K. Kitson, F K Kitson Safety Assoc., NC
(Member Emeritus)

Lewis G. Matthews, Las Cruces, NM
(Member Emeritus)
Joanne E. Slattery, U.S. Dept. of Labor OSHA, DC

Theodore C. Lemoff, NFPA Staff Liaison

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.

Committee Scope: This Committee shall have primary responsibility for documents on the storage, transfer, and use of industrial gases. Included are the storage and handling of such gases in their gaseous or liquid phases; the installation of associated storage, piping, and distribution equipment; and operating practices. The Committee also has a technical responsibility for contributions in the same areas for medical gases and clean rooms.

Contents

Chapter 1 Introduction	51A- 4	Chapter 6 Acetylene Compressors and High Pressure Driers	51A- 7
1-1 Purpose	51A- 4	6-1 Installation	51A- 7
1-2 Scope	51A- 4	6-2 Design	51A- 7
1-3 Definitions	51A- 4		
Chapter 2 Plant Location, Arrangement, Construction, and Utilities	51A- 5	Chapter 7 Acetylene Piping	51A- 7
2-1 Location	51A- 5	7-1 General	51A- 7
2-2 Arrangement	51A- 5	7-2 Piping for Pressure not Exceeding 15 Psig (103 kPa)	51A- 7
2-3 Construction	51A- 5	7-3 Piping for Pressure Exceeding 15 Psig (103 kPa)	51A- 7
2-4 Ventilation	51A- 5	7-4 Cylinder Charging Leads	51A- 8
2-5 Heating	51A- 5		
2-6 Electrical Equipment	51A- 5	Chapter 8 Acetylene Cylinder Charging Manifolds, Acetoning Equipment, and Mobile Acetylene Trailer Systems	51A- 8
Chapter 3 Calcium Carbide	51A- 5	8-1 General	51A- 8
3-1 Drums and Containers	51A- 5	8-2 Acetoning Equipment	51A- 8
3-2 Storage Areas	51A- 6	8-3 Charging Procedures	51A- 8
3-3 Handling	51A- 6	8-4 Cylinder Cooling Systems	51A- 8
		8-5 Cylinder Storage	51A- 8
Chapter 4 Acetylene Generators and Calcium Carbide Residue	51A- 6	8-6 Mobile Acetylene Trailer Systems	51A- 8
4-1 Design	51A- 6	Chapter 9 Fire Prevention and Protection	51A- 8
4-2 Installation	51A- 6	9-1 Fire Prevention	51A- 8
4-3 Venting of Generator	51A- 6	9-2 Fire Protection	51A- 8
4-4 Operating Instructions	51A- 6		
4-5 Calcium Carbide Residue Disposal	51A- 6	Chapter 10 General Provisions	51A- 9
		10-1 General Provisions	51A- 9
Chapter 5 Acetylene Gasholders, Purifiers, and Low Pressure Driers	51A- 6	Chapter 11 Referenced Publications	51A- 9
5-1 Location of Gasholder	51A- 6	Appendix A Explanatory Material	51A- 9
5-2 Installation of Gasholder	51A- 7	Appendix B Referenced Publications	51A- 9
5-3 Low Pressure Purifiers and Driers	51A- 7	Index	51A-10

NFPA 51A**Standard for****Acetylene Cylinder Charging Plants****1996 Edition**

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

Information on referenced publications can be found in Chapter 11 and Appendix B.

Chapter 1 Introduction

1-1 Purpose. This standard provides 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 shall apply to plants that 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 that is not in strict compliance with the provisions of this standard shall be permitted to continue operations where such use does not constitute a distinct hazard to life or adjoining property.

1-2.3 This standard shall not apply to plants that only produce and compress acetylene for chemical operations or to plants that only produce and compress acetylene below 15 psig (103 kPa). (Refer to NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, for acetylene generating plants where the acetylene is used with oxygen for welding, cutting, heating, and heat-treating operations.)

1-3 Definitions. For the purposes of this standard the following definitions shall apply:

Acetylene, High Pressure. Acetylene at pressures exceeding 15 psig (103 kPa), but not exceeding 400 psig (2760 kPa).

Acetylene, Low Pressure. Acetylene at a pressure not exceeding 1 psig (6.9 kPa).

Acetylene, Medium Pressure. Acetylene at pressures exceeding 1 psig (6.9 kPa), but not exceeding 15 psig (103 kPa).

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, 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 that is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. 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, or 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 or her 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 arresters, 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 that, 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 gauge.

Shall. Indicates a mandatory requirement.

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

Unpierced Wall. A wall that can have pipes or conduits passing through it; or windows, glazed with safety glass or wired glass, set in it; but where such openings are 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 can be built upon. A lesser distance shall be permitted 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 shall be permitted to 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 can 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 shall not be 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 that 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, shall be 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 shall not have floors above or basements beneath the cylinder charging area.

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

2-3 Construction.

2-3.1 Walls, partitions, and roofs of buildings where 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 constructed of lightweight materials or panels designed to relieve at a maximum internal pressure of 25 lb/ft².

NOTE: See NFPA 68, *Guide for Venting of Deflagrations*, for guidance in the construction techniques.

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. Rooms housing acetylene operations, excluding calcium carbide storage rooms (see 3-2.7), shall be ventilated at a rate of not less than 1 ft³ (0.03 m³) per min per ft² (0.09 m²) 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.

Exception: Ventilation shall be permitted to be reduced below 1 ft³ (0.03 m³) per min per ft² (0.09 m²), provided the full ventilation is automatically restored when the acetylene concentration exceeds 20 percent of the lower flammable limit of acetylene.

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, shall be 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.

2-6.3 A readily accessible emergency electrical shutdown switch shall be provided to shut down compressors and generators at the building exits.

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 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 where calcium carbide is handled, stored, or used shall be 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 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 can 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 that have accumulations of ice and snow shall be 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.

3-3 Handling. Locations where calcium carbide is transferred from transport containers to generator hopper loading carts or systems shall be protected from rain.

Chapter 4 Acetylene Generators and Calcium Carbide Residue

4-1 Design. This section shall not 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 shall be permitted provided that the second story is used only for charging the generators with calcium carbide. Outdoor installations shall be permitted where 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 pressure relief devices to prevent pressures in excess of the allowable pressure rating of the generator. The relief vent piping shall be 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 shall be 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 practical 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 shall not prohibit connecting two pressure relief device vents protecting the same section of a generator from connecting to a common vent pipe of cross sectional area equal to the sum of the cross sectional areas of the individual vents.

4-4 Operating Instructions. 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 shall be permitted to have a clear-water connection to public sewers if such disposal means is approved by the authority having jurisdiction.

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 that can 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 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 shall be permitted to be located outdoors or inside of buildings.

5-1.2 The gasholder shall be located at least 50 ft (15 m) from places of public assembly 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 that can be built upon, or public way.

5-1.3 Indoor gasholders shall be located in a room that complies with the requirements of Chapter 2 of this standard. This room shall be permitted to 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 located beneath, or where exposed by failure of electric power lines, piping containing all classes of flammable or combustible liquids (see NFPA 30, *Flammable and Combustible Liquids Code*), or piping containing other flammable gases.

5-2.3 Weeds and grass within 25 ft (7.6 m) of the gasholder shall be kept cut and the cuttings shall be removed. Combustible material shall not be permitted within 25 ft (7.6 m) of the gasholder.

5-2.4 The gasholder shall be marked: ACETYLENE -FLAMMABLE GAS - DANGER - KEEP FIRE AND OPEN FLAMES AWAY.

5-3 Low Pressure Purifiers and Driers. 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, shall be 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 practical 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. Where water is used, the flow of water from the cooling jackets and intercoolers shall be visible to the operator.

6-2.3 A pressure gauge 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. The pressure relief device in the final stage shall be set no higher than 450 psig (3100 kPa).

6-2.5 Transmission belts where 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. 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. and less shall be at least Schedule 80.

7-3.3 All pipe of nominal sizes 1¼ in. and 1½ in. shall be at least Schedule 160.

7-3.4 All pipe fittings shall have a minimum working pressure of 3000 psig (20.7 MPa).

7-3.5 Pressure gauge Bourdon tubes shall be steel or copper alloys meeting the requirements of 10-1.2.

7-3.6 Each pressure gauge shall be protected by a device that will stop a detonation flame and limit the rise in pressure on the pressure gauge side to prevent bourdon tube deformation.

7-3.7 Piping shall be hydrostatically tested at 4500 psig (31 MPa). Pressure relief valves, pressure gauges, diaphragm valves, regulators, and flash arresters shall be exempted from this provision.

7-4 Cylinder Charging Leads. 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 pressure gauge shall be protected by a device that will stop a detonation flame and limit the rise in pressure on the pressure gauge side to prevent bourdon tube deformation.

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 stress in the cylinder charging leads is limited to prevent failure.

8-1.6 Acetylene cylinders that have provision for caps shall not be required to have caps in place when in the acetylene cylinder charging plant.

8-2 Acetoning Equipment. 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. Acetylene cylinders connected to charging manifolds shall have provisions for cooling by water spray applied from a manually activated spray nozzle system, where needed for removing heat of solution of acetylene, as determined by ambient temperature and cylinder charging rate.

8-5 Cylinder Storage. Charged cylinders shall be stored outside the charging room. In the charging room, they shall be located as far as practical from the charging manifolds.

8-6* Mobile Acetylene Trailer Systems. (See A-8-6.)

Chapter 9 Fire Prevention and Protection

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.

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. 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 and cylinder storage areas 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, they shall be in accordance with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*. Automatic actuation shall be permitted to be by means of fusible links. Water coverage shall be not less than 0.25 gpm/ft² (0.02 L/s/m²) 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*, shall be permitted as an acceptable alternate.

9-2.3 The plant areas devoted to calcium carbide storage, handling, and acetylene generation shall not be equipped with fire protection sprinkler systems.

9-2.4 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.

9-2.5 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 can 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 can 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, in accordance with NFPA 70, *National Electrical Code*.

10-1.4 Generators, compressors, and pressure relief devices shall be 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, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1994 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 1990 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 1993 edition.

NFPA 70, *National Electrical Code*, 1996 edition.

NFPA 101, *Life Safety Code*, 1994 edition.

NFPA 220, *Standard on Types of Building Construction*, 1995 edition.

11-1.2 Other Publications.

11-1.2.1 ANSI Publication. American National Standards Institute, 1430 Broadway, New York, NY 10018.

ANSI A13.1, *Scheme for Identification of Piping Systems*, 1981.

11-1.2.2 ASTM Publication. American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103.

ASTM E 136, *Standard Method of Test for Behavior of Materials in a Vertical Tube Furnace at 750°C*, 1982.

Appendix A Explanatory Material

This Appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

A-8-6 For information on acetylene trailer systems, see CGA Recommended Practice G 1.6, *Recommended Practice for Mobile Acetylene Trailer Systems*.

A-9-1 The major fire hazard in the acetylene plant is that of acetylene gas escaping from equipment, piping, or cylinder fittings. The gas might or might 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.

Appendix B Referenced Publications

B-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.

B-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 1992 edition.

B-1.2 CGA Publications. The following publications are available from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.

CGA Pamphlet G-1, *Acetylene*, 1990.

CGA Pamphlet G-1.6, *Recommended Practices for Mobile Acetylene Trailer Systems*, 1991.

Index

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-A-		
Acetoning equipment	8-2	
Acetylene		
High pressure (definition)	1-3	
Low pressure (definition)	1-3	
Medium pressure (definition)	1-3	
Acetylene operations (definition)	1-3	
Alarms	9-2.5	
Approved (definition)	1-3	
Arrangement of plant	2-2	
Authority having jurisdiction (definition)	1-3	
-C-		
Calcium carbide	Chap. 3	
Drums and containers	3-1, 3-2.4	
Fire protection for	9-2.3	
Handling	3-3	
Residue disposal	4-5	
Residue pond	2-2.4, 4-5.3	
Storage	2-3.2, 2-4, 2-5.3, 2-6.2, 3-2	
Charging, of other gases	1-2.1, 2-2.1	
Charging procedures, acetylene	8-3	
Compressors		
Bonding	10-1.3	
Design	6-2	
Installation	6-1	
Marking	10-1.4	
Shutdown switch	2-6.3	
Construction of plant	2-3	
Containers	see also Cylinders	
Acetone	8-2	
Calcium carbide	3-1, 3-2.4	
Copper, unalloyed	10-1.1	
Copper alloys	10-1.2	
Cylinder charging leads	7-4	
Cylinder charging manifolds	8-1	
Grounding	10-1.3	
Cylinders		
Cooling systems	8-4	
Storage	2-2.1, 2-5.3, 8-5	
-D-		
Definitions	1-3	
Design		
Compressors	6-2	
Generators	4-1	
Drains	6-1.2	
Driers		
High pressure	6-1.2	
Low pressure	5-3	
Drums, calcium carbide	3-1	
-E-		
Electrical equipment	2-6, 10-1.3	
Emergency procedure	9-2.5	
Existing plants	1-2.2	
Exits	2-3.3, 9-1.3	
-F-		
Fire drills	9-2.5	
Fire prevention	9-1, A-9-1	
Fire protection	9-2	
-G-		
Gasholders		
Installation	5-2	
Location	5-1	
General provisions	Chap. 10	
Generators		
Bonding	10-1.3	
Calcium carbide residue disposal	4-5	
Design	4-1	
Fire protection	9-2.3	
Installation	4-2	
Marking	10-1.4	
Operating instructions	4-4	
Shutdown switch	2-6.3	
Venting	4-3	
-H-		
Handling, calcium carbide	3-3	
Heating of plant	2-5	
High hazards occupancy, classification as	2-3.3	
High pressure acetylene (definition)	1-3	
High pressure driers	6-1.2	
Hose stations	9-2.1, 9-2.4	
-I-		
Installation		
Compressors	6-1	
Generators	4-2	
-L-		
Limited-combustible material	2-3.1	
Definition	1-3	
Listed (definition)	1-3	
Location of plant	2-1	
Low pressure acetylene (definition)	1-3	
Low pressure purifiers and driers	5-3	
-M-		
Marking, of equipment	7-1.1, 10-1.4	
Medium pressure acetylene (definition)	1-3	
Medium pressure systems	6-1.2	
Mercury	10-1.1	
Mobile acetylene trailer systems	8-6, A-8-6	
Definition	1-3	
-N-		
Noncombustible material	2-3.1	
Definition	1-3	
-O-		
Operating instructions, generator	4-4	
-P-		
Piping	Chap. 7	
Bonding	10-1.3	
Bracing and supporting	7-1.2	

Identification	7-1.1
Pressure exceeding 15 psig	7-3
Pressure not exceeding 15 psig	7-2
Plant (definition)	1-3
Pressure relief devices, marking	10-1.4
Psig (definition)	1-3
Purifiers, low pressure	5-3
Purpose of standard	1-1

-R-

Referenced publications	Chap. 11, App. B
--------------------------------------	------------------

-S-

Scope of standard	1-2
Security	2-2.4
Shall (definition)	1-3
Should (definition)	1-3
Shutdown switch, emergency	2-6.3
Silver	10-1.1
Smoking prohibition	4-5.3, 9-1.1

Sprinkler systems	9-2.2 to 9-2.4
Storage	
Acetone containers	8-2
Calcium carbide	2-3.2, 2-4, 2-5.3, 2-6.2, 3-2, 9-2.3
Cylinders	2-2.1, 2-5.3, 8-5

-U-

Unpierced walls	2-2.2
Definition	1-3

-V-

Ventilation of plant	2-4
Venting, generators	4-3

-W-

Walls, unpierced	2-2.2
Definition	1-3
Warning signs	2-2.4, 3-2.2, 4-5.3, 9-1.1
Water spray systems	9-2.2

The NFPA Codes and Standards Development Process

Since 1896, one of the primary purposes of the NFPA has been to develop and update the standards covering all areas of fire safety.

Calls for Proposals

The code adoption process takes place twice each year and begins with a call for proposals from the public to amend existing codes and standards or to develop the content of new fire safety documents.

Report on Proposals

Upon receipt of public proposals, the technical committee members meet to review, consider, and act on the proposals. The public proposals – together with the committee action on each proposal and committee-generated proposals – are published in the NFPA's Report on Proposals (ROP). The ROP is then subject to public review and comment.

Report on Comments

These public comments are considered and acted upon by the appropriate technical committees. All public comments – together with the committee action on each comment – are published as the Committee's supplementary report in the NFPA's Report on Comments (ROC).

The committee's report and supplementary report are then presented for adoption and open debate at either of NFPA's semi-annual meetings held throughout the United States and Canada.

Association Action

The Association meeting may, subject to review and issuance by the NFPA Standards Council, (a) adopt a report as published, (b) adopt a report as amended, contingent upon subsequent approval by the committee, (c) return a report to committee for further study, and (d) return a portion of a report to committee.

Standards Council Action

The Standards Council will make a judgement on whether or not to issue an NFPA document based upon the entire record before the Council, including the vote taken at the Association meeting on the technical committee's report.

Voting Procedures

Voting at an NFPA Annual or Fall Meeting is restricted to members of record for 180 days prior to the opening of the first general session of the meeting, except that individuals who join the Association at an Annual or Fall Meeting are entitled to vote at the next Fall or Annual Meeting.

"Members" are defined by Article 3.2 of the Bylaws as individuals, firms, corporations, trade or professional associations, institutes, fire departments, fire brigades, and other public or private agencies desiring to advance the purposes of the Association. Each member shall have one vote in the affairs of the Association. Under Article 4.5 of the Bylaws, the vote of such a member shall be cast by that member individually or by an employee designated in writing by the member of record who has registered for the meeting. Such a designated person shall not be eligible to represent more than one voting privilege on each issue, nor cast more than one vote on each issue.

Any member who wishes to designate an employee to cast that member's vote at an Association meeting in place of that member must provide that employee with written authorization to represent the member at the meeting. The authorization must be on company letterhead signed by the member of record, with the membership number indicated, and the authorization must be recorded with the President of NFPA or his designee before the start of the opening general session of the Meeting. That employee, irrespective of his or her own personal membership status, shall be privileged to cast only one vote on each issue before the Association.

Sequence of Events Leading to Publication of an NFPA Committee Document

Call for proposals to amend existing document or for recommendations on new document.



Committee meets to act on proposals, to develop its own proposals, and to prepare its report.



Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward.
Lacking two-thirds approval, report returns to committee.



Report is published for public review and comment. (Report on Proposals - ROP)



Committee meets to act on each public comment received.



Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.



Supplementary report is published for public review. (Report on Comments - ROC).



NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP and ROC).



Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.



Complaints to Standards Council on Association action must be filed
within 20 days of the NFPA Annual or Fall Meeting.



Standards Council decides, based on all evidence, whether or not to issue standard
or to take other action, including hearing any complaints.



Appeals to Board of Directors on Standards Council action must be filed
within 20 days of Council action.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

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National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101

Fax No. 617-770-3500

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal-closing date.

If you need further information on the standards-making process, please contact the
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Date 9/18/93 Name John B. Smith Tel. No. 617-555-1212

Company _____

Street Address 9 Seattle St., Seattle, WA 02255

Please Indicate Organization Represented (if any) Fire Marshals Assn. of North America

1. a) NFPA Document Title National Fire Alarm Code NFPA No. & Year NFPA 72, 1993 ed.

b) Section/Paragraph 1-5.8.1 (Exception No.1)

2. Proposal recommends: (Check one) ☐ new text
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Delete exception.

4. Statement of Problem and Substantiation for Proposal: (Note: State the problem that will be resolved by your recommendation; give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

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.

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Please Indicate Organization Represented (if any) _____

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

b) Section/Paragraph _____

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