NFPA 1981 Self-Contained Breathing Apparatus For Fire Fighters 1981 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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NFPA 1981

Standard on

Self-Contained Breathing Apparatus for Fire Fighters

1981 Edition

This edition of NFPA 1981, *Standard on Self-Contained Breathing Apparatus for Fire Fighters*, was prepared by the Technical Committee on Protective Equipment for Fire Fighters, and acted on by the National Fire Protection Association, Inc. on May 19, 1981 at its Annual Meeting in Dallas, Texas. It was issued by the Standards Council with an effective date of July 29, 1981.

Origin and Development of NFPA 1981

This new standard was developed by the Technical Committee on Protective Equipment for Fire Fighters to provide standard requirements for use of specific types of self-contained breathing apparatus for protection of fire fighters exposed to hazardous atmospheres, or where the potential for exposure to hazardous atmospheres exists. The Committee has recognized that, for open circuit self-contained breathing apparatus, only positive pressure (pressure demand) SCBA offers adequate protection.

NFPA 1981 replaces NFPA 19B, *Standard on Respiratory Protective Equipment for Fire Fighters*, 1971. The major thrust of NFPA 19B was to prohibit the use of filtered type canister masks by fire fighters exposed to hazardous atmospheres, and to permit only the use of self-contained breathing apparatus. NFPA 19B was adopted on May 18, 1971 at the Association's Annual Meeting in San Francisco, California. NFPA 19B was officially withdrawn by the Association on May 19, 1981 at the Annual Meeting in Dallas, Texas.

Technical Committee on

Protective Equipment for Fire Fighters

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Boston Fire Department, MA
Rep. International Assn. of Fire Fighters

Wayde B. Miller, *Secretary*
Mine Safety Appliance Co.
Rep. Industrial Safety Equipment Assn.

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Robert L. Donahue, Underwriters Laboratories Inc.
Paul Faulkner, Phoenix Fire Department, AZ
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Rep. International Assn. of Fire Fighters
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Glenn E. Gardner, U.S. Occupational Safety & Health Admin.
(Alternate to T. H. Seymour)

Thomas H. Seymour, U.S. Occupational Safety & Health Admin.

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 1981

Standard on Self-Contained Breathing Apparatus for Fire Fighters

1981 Edition

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

Chapter 1 Administration

1-1 Scope.

1-1.1* The standard specifies self-contained breathing apparatus for structural fire fighting and other conditions where respiratory hazards are encountered, or where the potential for such hazards exists.

1-2 Purpose.

1-2.1 This standard provides information on the types of self-contained breathing apparatus to be used by fire fighters. It does not cover other types of respiratory protective equipment which may be used by fire fighters in unusual circumstances.

1-2.2 This standard is not intended to serve as a detailed manufacturing or purchasing specification, but may be referenced in purchase specifications as minimum acceptable requirements.

1-3 Definitions.

1-3.1 Air Flow Control Device. A manual or automatic device incorporated in the air flow system to control the free flow of air to the facepiece while donning or doffing.

1-3.2 Approved. A certificate or formal document issued by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) stating that the self-contained breathing apparatus has met the minimum requirements of Title 30 CFR, Part 11, Subpart H. For the approval to remain in effect, the device must be used and maintained in the approved condition.

1-3.3 Hazardous Atmosphere.

(a) Any atmosphere containing a toxic or disease-producing gas, vapor, dust, fume, or mist immediately dangerous to life or health or where the concentration is unknown.

(b) Any oxygen deficient atmosphere.

1-3.4 Immediately Dangerous to Life or Health. Conditions that pose an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health.

1-3.5 Oxygen Deficient Atmosphere. An atmosphere which contains an oxygen partial pressure of less than 148 mm of mercury (19.5 percent by volume at sea level).

1-3.6 SCBA. See self-contained breathing apparatus.

1-3.7 SCBA. Closed Circuit Apparatus. An apparatus of the type in which the exhalation is rebreathed by the wearer after the carbon dioxide has been effectively removed and a suitable oxygen concentration restored.

1-3.8 SCBA. Open Circuit Apparatus. An apparatus of the following types from which exhalation is vented to the atmosphere and not rebreathed.

(a) *Demand Type Apparatus.* An apparatus in which the pressure inside the facepiece, in relation to the immediate environment, is positive during exhalation and negative during inhalation.

(b) *Pressure Demand (Positive Pressure) Type Apparatus.* An apparatus in which the pressure inside the facepiece, in relation to the immediate environment, is positive during both inhalation and exhalation.

1-3.9 Self-Contained Breathing Apparatus (SCBA). A device providing the wearer with a supply of respirable gas carried in or generated by the apparatus. When in use, this apparatus requires no intake of air from the environment in which the wearer is operating.

1-3.10 Shall. Indicates a mandatory requirement.

1-3.11 Should. This term as used in the Appendix indicates a recommendation or that which is advised but not required.

Chapter 2 General

2-1 General Provisions.

2-1.1* All fire fighters exposed to hazardous atmospheres from fires and other emergencies, or where the potential for such exposures exists, shall be provided with self-contained breathing apparatus (SCBA) as set forth in this standard.

2-1.2* Only SCBA approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) shall be considered to meet the provisions of this standard.

2-1.3* Only SCBA with an approved service life of 30 minutes or more shall be considered acceptable under this standard.

2-1.4 Open circuit SCBA of the positive pressure type

operating in only the pressure-demand mode shall be considered to meet the provisions of this standard.

2-1.5 Open circuit SCBA of the positive pressure type, equipped with an air flow control device for donning and doffing purposes only, shall be considered to meet the provisions of this standard.

2-1.6 Open circuit SCBA approved by NIOSH/MSHA for use in the demand mode, or for use in both the demand mode and the pressure demand mode, shall NOT be considered to meet the requirements of this standard.

2-1.7 Closed circuit SCBA with NIOSH/MSHA approval shall be considered to meet the provisions of this standard.

Appendix

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

A-1-1.1 This standard covers only SCBA used primarily in structural fire fighting. In some situations respiratory protection other than SCBA may be required by fire fighters, such as external to buildings in platforms of aerial fire apparatus. It is recommended that such respiratory protection be NIOSH/MSHA approved under the appropriate Subpart of 30 CFR, Part 11. Demand and Pressure Demand Air-Line Respirators approved as Type C units under Subpart J for atmospheres not immediately dangerous to life or health are examples, as are combination apparatus including a SCBA and a Type C Air-Line unit which are approved under Subpart H.

A-2-1.1 There are requirements in many standards and regulations covering the quality of air to be used in SCBA and it is not the function of this Committee to reference all the established requirements. However, we do believe it mandatory to call the attention of all users to the fact that the quality of the air in the cylinder is of great concern, as well as assurance that it have a dew point compatible with the ambient temperature to be encountered.

A-2-1.2 All SCBA used by fire fighters must have NIOSH/MSHA approval. This Committee recognizes that the current approval requirements under 30 CFR, Part 11, Subpart H do not include all the testing and requirements needed to provide optimum SCBA for the fire fighter. The current low temperature tests need review. There are no high temperature tests and such are a major need. Excessive flow shut-off valves and buddy breathing are among a number of other areas needing immediate NIOSH consideration.

A-2-1.3 Approvals from NIOSH/MSHA for duration of use are based on tests conducted by NIOSH. Open circuit SCBA are tested with a breathing machine at a use rate of 40 liters per minute and are able to supply air for the rated service life or longer. Closed circuit SCBA are tested for service life with people wearing the apparatus and performing prescribed work, because the service life of such apparatus is based on metabolic use of oxygen and no mechanical test which can simulate this type of use is currently available.

However, because work performed by the user may be more or less strenuous than the work level of the test procedure, actual service life may be affected. During extreme exertion, for example, service life may be reduced as much as 50 percent. To assure proper utilization of equipment in actual situations, after training and instruction, it is recommended that users gain confidence by including participation while using SCBA in a series of tasks representing or approximating the physical demands likely to be encountered.

Service duration of each unit depends on such factors as:

(a) The degree of physical activity by the user.

(b) The physical condition of the user.

(c) Emotional conditions such as fear or excitement (which may increase the user's breathing rate).

(d) The degree of training or experience the user has had with such equipment.

(e) Whether or not the cylinder is fully charged at the beginning of use.

(f) Possible presence of carbon dioxide (CO_2) in the compressed air supply at levels greater than the 0.4 percent found in normal air.

(g) Atmospheric pressure, e.g., use in a pressurized tunnel or caisson. At two atmospheres (15 psig) the duration will be one-half as long as the rated service life; at three atmospheres the duration will be one-third as long as the rated service life.

(h) Condition of the breathing apparatus.

The Committee cannot mandate the minimum pressure which should be in the compressed air cylinder prior to use, but recommends strongly that it be not less than 90 percent of the pressure used in rating the service life, e.g., 2015 psig for a cylinder rated at 2216 psig.

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.)

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Address _____

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

   b) Section/Paragraph: _____

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   ☐ 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: _____

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