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NFPA 1983 Fire Service Life Safety Rope, Harnesses, and Hardware 1985 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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SC AM-85

NFPA 1983

Standard on

Fire Service Life Safety Rope, Harnesses, and Hardware

1985 Edition

This edition of NFPA 1983, *Standard on Fire Service Life Safety Rope, Harnesses, and Hardware*, was prepared by the Technical Committee on Protective Equipment for Fire Fighters, and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 13-17, 1985 in Chicago, Illinois. It was issued by the Standards Council on June 6, 1985, with an effective date of June 26, 1985.

The 1985 edition of this standard has been approved by the American National Standards Institute.

Origin and Development of NFPA 1983

The Technical Committee on Protective Equipment for Fire Fighters began work on this standard in 1982 in answer to requests from the fire service to establish requirements for rope used by the fire service to perform rescues. During the development of this standard, it became necessary to include harnesses and hardware that are used with the rope in rescue operations. The work was completed in the Spring of 1984 and submitted to the NFPA for official adoption. The first edition was issued in June 1985.

Technical Committee on Protective Equipment for Fire Fighters

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(Vote Limited to NFPA 1971)
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Christopher E. Coombs, Cairns & Brother Inc.
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Glenn E. Gardner, US Occupational Safety & Health Admin.
(Alternate to T. H. Seymour)
Thomas H. Seymour, US 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 1983

Standard on

Fire Service Life Safety Rope, Harnesses, and Hardware

1985 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 5.

Chapter 1 Administration

1-1 Scope.

1-1.1 This standard specifies minimum performance and design criteria and test methods for life safety rope, harnesses, and hardware used by the fire service. This standard does not cover equipment used for other purposes, such as water rescue or industrial applications.

1-2 Purpose.

1-2.1* The purpose of this standard is to provide a reasonable degree of safety for life safety rope, harnesses, and hardware used to support fire service personnel and civilians during rescue, fire fighting, and other emergency operations, or during training evolutions.

1-2.2 This standard is intended to serve as a minimum standard for those responsible for purchasing or preparing purchase specifications for such equipment.

1-2.3 This standard may be referenced in purchase specifications, but is not intended to serve as a detailed purchase specification.

1-3 Definitions.

Ascent Device. A friction or mechanical device utilized to allow ascending or clamping a fixed line.

Block Creel Construction. Rope constructed without knots or splices in the yarns, ply yarns, strands or braids, or rope. Unavoidable knots may be present in individual fibers as received from fiber supplier.

Breaking Elongation. Increase in length, expressed in percent of original length, that occurs in a sample of new rope pulled to the breaking point when tested as specified herein.

Buckle. Load-bearing fastener utilized to connect two pieces of webbing.

Continuous Filament Fiber. Fiber of indefinite or unmeasurable length.

Descent Device. A friction or mechanical device utilized to control descent down fixed line.

Fall Factor. A measure of fall severity calculated by dividing the distance fallen by the length of rope used to arrest the fall.

Hardware. Load-bearing accessories designed to be utilized with life safety rope and harnesses; includes but is not limited to rings, snap-links, pulleys, ascending devices and descending devices.

Life Safety Harness. Harness used to support people during fire service rescue.

Life Safety Rope. Rope dedicated solely for the purpose of constructing lines for supporting people during rescue, fire fighting, or other emergency operations, or during training evolutions.

Line. Rope when in use.

Maximum Working Load. Weight supported by the rope that shall not be exceeded in use.

Minimum Breaking Strength. Certified minimum strength of each rope sold when tested as specified herein.

One-Person Load. 300 lb.

One-Person Rope. Life safety rope designed to support a one-person load when in use; may also be used to support a two-person load when used in systems where two ropes are used as separate and equal members.

Ring. Ungated load-bearing fastener.

Self-Destructive Action. Interaction of dissimilar materials in a manner leading to deterioration.

Shall. Indicates a mandatory requirement.

Should. This term, as used in the appendix, indicates a recommendation or that which is advised but not required.

Snap-Link. Self-closing, gated, load-bearing fastener.

Two-Person Load. 600 lb.

Two-Person Rope. Life safety rope designed to support a two-person load when in use.

Virgin Fiber. Fiber that is new and previously unused.

Webbing. Woven material in the form of a long strip; can be of flat or tubular weave.

1-4 General.

1-4.1 The manufacturer of rope, harnesses, or hardware who claims that the product meets the requirements of this standard shall, upon request of purchaser, furnish a certificate of compliance that such product conforms to applicable requirements as specified herein.

1-4.2 The manufacturer of rope, harnesses, or hardware who claims that the product meets the requirements of this standard shall, upon request of purchaser, furnish

test data from an independent laboratory to substantiate that such product conforms to applicable requirements as specified herein.

1-4.3 The manufacturer of rope, harnesses, or hardware who claims that the product meets the requirements of this standard shall, with each purchase and upon request of purchaser, furnish inspection and maintenance procedures and retirement criteria.

Chapter 2 Life Safety Rope

2-1 Design and Construction.

2-1.1 Life safety rope class shall be designated in accordance with 2-3.2.1 of this chapter.

2-1.2 Rope designed to have a "maximum working load" of not less than 300 lb shall be classified as a one-person life safety rope.

2-1.3 Rope designed to have a "maximum working load" not less than 600 lb shall be classified as a two-person life safety rope.

2-1.4* Life safety rope shall be constructed of virgin fiber.

2-1.5 Life safety rope shall be of block creek construction; load-bearing elements shall be constructed of continuous filament fiber.

2-2 Marking and Instructions.

2-2.1 Each life safety rope shall be marked for its full length by insertion of a continuous water-resistant identification tape. The following information shall be legibly printed on the tape in water-insoluble ink not less than once every 3 ft:

Name of manufacturer

Manufacturer's identification number

"Conforms with NFPA Standard 1983"

2-2.2 Each life safety rope when sold shall have durably affixed a water-resistant tag. The following information shall be legibly printed on the tag in water-insoluble ink:

LIFE SAFETY ROPE
CONFORMS WITH NFPA STANDARD 1983

WARNING

USE ONLY FOR EMERGENCY LIFE SAFETY USE OR TRAINING – DESTROY IF USED IN ANY OTHER MANNER

ROPE USED FOR EMERGENCY OPERATIONS MUST BE PREVIOUSLY UNUSED – DESTROY AFTER SUCH USE

ROPE USED FOR TRAINING MUST BE INSPECTED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND DESTROYED IF INDICATED

FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN SERIOUS INJURY OR DEATH.

2-2.3 In addition to the statements specified in 2-2.2 of this section, the following information shall also be provided on the tag:

(a) Maximum working load as determined in 2-3.2

(b) Minimum breaking strength as determined in 2-3.2

(c) Circumference as determined in 2-3.3

(d) Nominal diameter

(e) Type of fibers as specified by manufacturer

(f) Name of manufacturer

(g) Country of manufacture

(h) Manufacturer's stock number

(i) Month and year of manufacture

(j) Manufacturer's lot number

(k) Rope class, number of persons.

2-2.4 The required information specified in 2-2.3 of this section shall be presented on the tag in the following manner:

"CLASS: _____ PERSON ROPE"

"MAXIMUM WORKING LOAD _____ lb"

"MINIMUM BREAKING STRENGTH _____ lb"

"CIRCUMFERENCE _____ in."

"NOMINAL DIAMETER _____ in."

Type of fiber(s)

Name of manufacturer

Manufacturer's product identification

Manufacturer's lot number

2-3 Performance Requirements.

2-3.1* Samples from each manufacturing lot shall be tested for breaking elongation and minimum breaking strength in accordance with either Test Method 6015 or 6016, as applicable, of Federal Test Method Standard 191, *Textile Test Methods*.

2-3.1.1* New rope breaking elongation shall not be less than 15 percent nor more than 55 percent.

2-3.1.2 New rope minimum breaking strength for one-person rope shall not be less than 4500 lb; and for two-person rope shall be not less than 9000 lb.

2-3.2 Maximum working load shall be expressed in pounds and calculated by dividing the new rope minimum breaking strength as specified in 2-3.1.2 of this section by a factor of not less than 15.

2-3.2.1 The person classification shall be calculated by dividing the maximum working load by a factor of not less than 300. Fractions occurring in the product of this calculation shall be rounded downward to the nearest whole number.

2-3.3 Life safety rope shall have a circumference of not less than 1⅛ in. and not more than 1½ in. for one-person rope, and not less than 1½ in. and not more than 2¼ in. for two-person rope when tested in accordance with

Method 6003 of Federal Test Method Standard 191, *Textile Test Methods*.

2-3.4 Life safety rope shall have a maximum weight of 0.09 lb/ft for one-person rope and 0.18 lb/ft for two-person rope when tested in accordance with Method 6004 of Federal Test Method Standard 191, *Textile Test Methods*.

2-3.5 Fiber utilized for life safety rope shall have a melting point of not less than 400°F (218°C) when tested in accordance with Method 1534 of Federal Test Method Standard 191, *Textile Test Methods*.

2-3.6 Dyed life safety rope shall show the following colorfastness:

(a) *Crocking*. Class 4 when tested in accordance with American Assocation of Textile Chemists and Colorists (AATCC) Method 8.

(b) *Washing*. Class 4, color change and staining, when tested in accordance with AATCC Method 61, IIA.

Chapter 3 Life Safety Harnesses

3-1 Design and Construction.

3-1.1* Webbing utilized to construct life safety harnesses shall be constructed of virgin, continuous filament fiber.

3-1.2 Life safety harnesses shall be designed and designated in accordance with the following classes:

(a) *Class I*. Harness that fastens around waist; designed to be used for securing to ladder or emergency escape with one-person loads.

(b) *Class II*. Harness that fastens around waist and around thighs or under buttocks; designed for rescue where two-person loads may be encountered.

(c) *Class III*. Harness that fastens around waist, around thighs or under buttocks, and over shoulders; designed for rescue where two-person loads may be encountered and inverting may occur.

3-1.3 All life safety harnesses shall be adjustable for over a range of not less than 30- to 50-in. waist size. In addition, Class III harnesses shall be adjustable over a range of 5 ft 6 in. to 6 ft 6 in. height.

3-1.4 All webbing ends shall be secured and heat-sealed.

3-1.5 All thread shall be compatible with webbing used, shall meet the strength and heat resistance requirements specified in Section 3-3 of this chapter, and shall be of contrasting color to the webbing to allow for ease of inspection. All stitching breaks or ends shall be backtacked not less than 1.0 in.

3-2 Marking and Instructions.

3-2.1 Each life safety harness shall have permanently affixed a synthetic fabric identification label sewn with synthetic thread or a riveted metal identification plate. The following information shall be legibly printed on the label in water-insoluble ink or inscribed on the plate. The life safety harness class shall be determined in accordance with 3-1.2 of this chapter.

"LIFE SAFETY HARNESS: CONFORMS WITH NFPA STANDARD 1983, CLASS _____"

"USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS"

"INSPECT AFTER EACH USE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS"

"REPAIR ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS"

Name of manufacturer

Manufacturer's product identification

Manufacturer's lot or serial number.

3-3 Performance Requirements.

3-3.1 Webbing used for load-bearing members in contact with body shall be not less than a nominal 1¾ in. in width with a nominal thickness of not less than 0.060 in. when tested in accordance with Method 5030 of Federal Test Method Standard 191, *Textile Test Methods*; and shall have a minimum breaking strength of not less than 6000 lb when tested in accordance with Method 4108 of Federal Test Method Standard 191, *Textile Test Methods*. Harnesses can be subjected to two-person loads during rescue operations. A 6000-lb rating establishes a 10:1 safety factor for this component. While harnesses are not subject to the same dangers as ropes, they are more fragile than hardware to physical effects.

3-3.2 All structural stitching shall withstand a tensile test of not less than 1200 lb without permanent distortion and not less than 6000 lb without failure.

3-3.3 All riveting shall withstand a tensile test of not less than 1200 lb without permanent distortion and not less than 6000 lb without failure.

3-3.4 Finished harnesses shall be tested in accordance with ANSI A10.14, *Requirements for Safety Belts, Harnesses, Lanyards, Lifelines, and Drop Lines for Construction and Industrial Use*, utilizing a 300-lb dummy and a ¾-in. polyester double-braided lanyard of a nominal 6 ft in length meeting the requirements of MIL-R-24536 without failure.

3-3.5 All fiber used in the construction of life safety harnesses including webbing, thread, and labels shall have a melting point of not less than 400°F (218°C) when tested in accordance with Test Method 1534 of Federal Test Method Standard 191, *Textile Test Methods*.

3-3.6 Dyed life safety harness shall show the following colorfastness:

(a) *Crocking*. Class 4, when tested in accordance with American Association of Textile Chemists and Colorists (AATCC) Method 8.

(b) *Washing*. Class 4, color change and staining, when tested in accordance with AATCC Method 61, IIA.

Chapter 4 Hardware

4-1 Design and Construction.

4-1.1 All hardware shall not be constructed or utilized in a manner that allows self-destructive action.

4-1.2 All load-bearing hardware shall be constructed of forged, machined, stamped, extruded, or cast metal. Castings shall meet quality assurance requirements of MIL-C-6021, Class I, Radiographic Grade A.

4-1.3 Buckles shall have a corner radius of not less than 0.25 in.

4-1.4* Snap-link gates shall be of a positive locking design.

4-2 Marking and Instructions.

4-2.1 Load-bearing hardware shall be permanently stamped or engraved with the name of the manufacturer or MIL-SPEC number, if applicable.

4-2.2 The manufacturer shall supply, with load-bearing hardware and upon request, instructions for use, inspection, maintenance, and retirement criteria.

4-3 Performance Requirements.

4-3.1 All hardware shall pass without corrosion a 50-hour salt spray applied in accordance with ASTM B117, *Salt Spray (Fog) Testing*.

4-3.2 All load-bearing hardware shall withstand not less than a 1200-lb tensile test without permanent distortion.

4-3.3 All buckles shall withstand a tensile test of not less than 5000 lb without failure.

4-3.4* All rings shall withstand a tensile test of not less than 5000 lb without failure when tested in manner of function.

4-3.5* All snap-links shall withstand a tensile test of not less than 5000 lb without failure when tested in manner of function.

4-3.6* All ascent devices shall withstand a tensile test of not less than 1200 lb without failure when tested in manner of function.

4-3.7* All descent devices shall withstand a tensile test of not less than 1200 lb without permanent distortion and not less than 5000 lb without failure; both tests shall be performed in manner of function.

Chapter 5 Referenced Publications

5-1* 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 shall be current as of the date of the NFPA issuance of this document.

5-1.1* AATCC Publications.

AATCC Method 8, *Colorfastness to Crocking*, 1981 Edition

AATCC Method 61, IIA, *Colorfastness to Washing, Domestic and Laundering, Commercial: Accelerated*, 1980 Edition

5-1.2* ANSI Publication.

ANSI A10.14, *Requirements for Safety Belts, Harnesses, Lanyards, Lifelines, and Drop Lines for Construction and Industrial Use*, 1975 Edition

5-1.3* ASTM Publication.

ASTM B117, *Salt Spray (Fog) Testing*, 1973 Edition

5-1.4* GSA Publication.

Federal Test Method Standard 191, *Textile Test Methods*, July 20, 1978

Appendix A

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

A-1-2.1 Fire fighting and rescue are hazardous activities. It is the responsibility of the fire department to obtain expert instruction and to take adequate safety precautions based upon manufacturer's recommendations. Fire department training should include use techniques, maintenance procedures including properties of synthetic fiber rope, and deployment techniques, including abrasion protection and selection of anchor points.

A-2-1.4 If finish is applied to rope fiber during production, it should not interfere with sale usage of the rope due to undue slipperiness; this characteristic should be evaluated by the fire department before rope is purchased.

A-2-3.1 Any rope can be severely damaged and can fail when cut by a sharp edge or when subject to abrasion over rough surfaces. Rope should be protected from such hazards with appropriate abrasion protection. Many constructions of rope that meet the requirements of this standard could pose difficulties with knotting or splicing easily or interfacing effectively with all systems of use and all type of life safety harnesses and associated equipment. Evaluation should be done by the fire department before purchase to assure compatability. Rope end terminations such as knots and splices should be made in accordance with manufacturer's instructions.

A-2-3.1.1 Rope elongation is related to the amount of energy a rope can safely absorb when used to arrest a fall. For all ropes, and especially when fall factors can exceed one, manufacturers should be consulted to assure that rope with appropriate elongation and energy absorption is selected for each application.

A-3-1.1 Many life safety harnesses and hardware that meet the requirements of this standard might not interface effectively with all systems of use and all types of life safety rope. Evaluation should be done by the fire department before purchase to assure compatability.

A-4-1.4 Positive locking devices can include screw and spring collars and are designed to prevent gates from opening accidently during use.

A-4-3.4 Testing in "manner of function" will differ depending on type of device tested. For example, a figure-of-eight descent device could be tested by looping a steel cable through the device as unit would be utilized.

A-4-3.5 See A-4-3.4.

A-4-3.6 See A-4-3.4.

A-4-3.7 See A-4-3.4.

A-5-1 These references are listed separately to facilitate updating to the latest edition by the user.

A-5-1.1 These publications are available from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

A-5-1.2 This publication is available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

A-5-1.3 This publication is available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

A-5-1.4 This publication is available from General Services Administration, Specifications Activity, Printed Materials Supply Division, Building 197, Naval Weapons Plant, Washington, DC 20407.

SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

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

INSTRUCTIONS

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

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

3. In the space identified as "Proposal" include the wording you propose as revised text, deleted text, or new 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

Organization Represented Fire Marshals Assn. of North America

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

1. **Section/Paragraph:** 2-7.1 (Exception)

2. **Proposal (include proposed wording, or identification of wording to be deleted):**

Delete exception.

3. **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.

4. ☒ **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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