NFPA® 1983

Standard on Life Safety Rope and Equipment for Emergency Services

2012 Edition

NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

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NFPA® 1983

Standard on

Life Safety Rope and Equipment for Emergency Services

2012 Edition

This edition of NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services,* was prepared by the Technical Committee on Special Operations Protective Clothing and Equipment and released by the Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on December 13, 2011, with an effective date of January 2, 2012, and supersedes all previous editions.

This edition of NFPA 1983 was approved as an American National Standard on January 2, 2012.

Origin and Development of NFPA 1983

The Technical Committee on Protective Equipment for Fire Fighters (then renamed as the Technical Committee on Fire Service Protective Clothing and Equipment) 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 the standard, harnesses and hardware used with the rope in rescue operations were included. The work was completed in the spring of 1984 and submitted to NFPA for official adoption. The first edition was issued on June 6, 1985.

The Subcommittee on Life Safety Ropes began revision of the 1985 edition in late 1987 and turned over its proposals to the Technical Committee in December 1988. The Technical Committee completed its work on the document in April 1989, and it was submitted for the Annual Meeting 1990 cycle. The second edition was issued on July 20, 1990.

During 1993, NFPA restructured the manner in which committees were organized, and all standing subcommittees were eliminated. Within the Technical Committee on Fire Service Protective Clothing and Equipment, the former standing subcommittees were reorganized as task groups to address specific technical issues, and the technical committee assumed the entire responsibility for NFPA 1983.

In October 1994, just after the revisions for the third edition were completed, the Standards Council appointed the Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment to oversee all fire and emergency services protective clothing and equipment issues. The existing Technical Committee on Fire Service Protective Clothing and Equipment had ceased to exist in May 1995, and seven new technical committees, each responsible for a different segment of the fire and emergency services protective clothing and equipment spectrum, were now in place. The future responsibility for NFPA 1983 would now rest with the new Technical Committee on Special Operations Protective Clothing and Equipment, operating under the Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment.

The third (1995) edition of NFPA 1983 was a complete revision to the document. The document was reformatted to present the certification requirements, the product labeling and user information requirements, the design requirements, the performance requirements, and the testing requirements each in separate chapters. A different approach was taken to life safety rope and the various items used in conjunction with the rope. While the life safety rope remained as the key subject of the document, other items used in conjunction with the rope were addressed as system components.

The 1995 edition also included new criteria for personal escape rope to cover a type of life safety rope that is carried by fire fighters/rescuers and used only for fire fighter/rescuer escape or self-rescue in critical entrapment situations where the rope would provide the only viable means of escape. There were also new criteria, in addition to the harness requirements, for two types of belts: one intended for use to position a fire fighter on a ladder, and a second type for escape/self-rescue using a life safety rope. Definitions were expanded to provide

better understanding of terms. The testing requirements were greatly expanded to provide the criteria with which to evaluate performance and determine pass/fail.

The 1995 edition was acted on by the membership of the Association at the Annual Meeting in Denver, Colorado, on May 24, 1995, and was issued with an effective date of August 11, 1995.

The fourth (2001) edition of NFPA 1983 added a new type of rope — a throwline — a floating rope intended to be thrown to a person in water or used as a tether for rescuers during water rescue incidents. New requirements for pulleys and portable anchors were also added to the fourth edition as new items of system components. The former terminology for one- and two-person load classifications was changed to a simpler load classification based on the weight that the rope or system is designed to support.

In the 2001 edition, testing methods for descent control devices were modified to provide more accurate testing for the three types of descenders. Other testing modifications were made throughout Chapter 6 to clarify testing methods and improve reproducibility of testing results.

The 2001 edition also included new requirements for improved product quality assurance through manufacturer's being registered as compliant with the ISO, and certification laboratory accreditation. Annual product evaluation, testing, and recertification were also added. All three of these new criteria were directed to raise the bar for product and certification quality and to provide a better level of safety for the end users.

Throughout the 2001 edition, modifications to existing text were made in the continuing attempt to make the document clearer, less ambiguous, and easier to use by both manufacturers and the certification organizations. This process continues during every revision cycle, and the input received from document users has been very helpful in fixing many of these issues.

The 2001 edition was acted on by the Association membership at the Fall Meeting in Orlando, Florida, on November 15, 2000, and was issued with an effective date of February 9, 2001.

With the fifth (2006) edition of NFPA 1983, the title of the document was changed to *Standard on Life Safety Rope and Equipment for Emergency Services,* to reflect the broader audience for this type of equipment. The 2006 edition continued to refine design and performance criteria and test methods. The former approach of system components was changed to all items being independent and tested according to the type of use to which they could be subjected. Labeling requirements were specified for items that can have detachable components to better advise the user to be sure that all components are assembled properly in order to safely use the equipment.

Throughout the 2006 edition document, modifications to existing text were made in the continuing attempt to make the document clearer, less ambiguous, and easier to use by both manufacturers and the certification organizations. This process continues during every revision cycle and the input received from document users has been very helpful in fixing many of these issues.

The 2006 edition was issued by the NFPA Standards Council on January 27, 2006, with an effective date of February 16, 2006.

The 2012 (sixth) edition of NFPA 1983 features editorial changes, new definitions, and current terminology. It also has several new performance requirements in Chapter 7, including those for litters, escape webbing, fire escape webbing, victim extrication devices, escape systems, fire escape rope, manufacturer-supplied eye termination, moderate elongation laid life saving rope, belay devices, and escape anchor devices. The related test methods for these items have also been added to Chapter 8.

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Committee Scope: This Committee shall have primary responsibility for documents on the design, performance, testing, and certification of protective clothing and protective equipment manufactured for fire and emergency services organizations and personnel, to protect against exposures encountered during emergency incident operations. This Committee shall also have the primary responsibility for documents on the selection, care, and maintenance of such protective clothing and protective equipment by fire and emergency services organizations and personnel.

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Committee Scope: This Committee shall have primary responsibility for documents on special operations protective clothing and protective equipment, except respiratory equipment, that provides hand, foot, torso, limb, head, and interface protection for fire fighters and other emergency services responders during incidents involving special operations functions including, but not limited to, structural collapse, trench rescue, confined space entry, urban search and rescue, high angle/mountain rescue, vehicular extraction, swift water or flooding rescue, contaminated water diving, and air operations.

This Committee shall also have primary responsibility for documents on station/work uniform garments that are not of themselves primary protective garments but can be combined with a primary protective garment to serve dual or multiple functions.

Additionally, this Committee shall have primary responsibility for documents on the selection, care, and maintenance of special operations protective clothing and equipment by fire and emergency services organizations and personnel.

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Standard on

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Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1 Scope.

1.1.1 This standard shall specify minimum design, performance, testing, and certifications requirements for life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, victim extrication devices, litters, escape webbing, escape systems, and auxiliary equipment for emergency services personnel.

1.1.2 This standard shall specify requirements for *new* life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, manufacturer-supplied eye terminations, moderate elongation laid life safety rope, belay devices, and auxiliary equipment.

1.1.3 This standard shall not specify requirements for any accessories that could be attached to the certified product but are not necessary for the certified product to meet the requirements of this standard.

1.1.4 This standard shall not specify requirements for any utility rope.

1.1.5 This standard shall not specify requirements for any rope or associated equipment designed for mountain rescue, cave rescue, lead climbing operations, or where expected hazards and situations dictate other performance requirements.

1.1.6* This standard shall not specify requirements for any rope or equipment for fall protection pertaining to employees of general industry or the construction and demolition industry.

1.1.7 This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant life safety rope or associated equipment. It shall be the responsibility of the persons and organizations that use compliant life safety rope or associated equipment to establish safety and health practices and determine the applicability of regulatory limitations prior to use.

1.1.8 This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of life safety rope to establish safety and health practices and determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, and testing.

1.1.9 Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

1.2 Purpose.

1.2.1* The purpose of this standard shall be to establish minimum levels of performance for life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, manufacturer-supplied eye terminations, moderate elongation laid life safety rope, belay devices, and auxiliary equipment for emergency services personnel.

1.2.2 Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance for all situations to which this equipment could be exposed.

1.2.3 This standard is not intended to serve as a detailed manufacturing or purchase specification, but shall be permitted to be referenced in purchase specifications as minimum requirements.

1.3 Application.

1.3.1 This standard shall apply to the design, performance, testing, and certification of new emergency services life safety rope, escape rope, water rescue throwlines, life safety harnesses, belts, manufacturer-supplied eye terminations, moderate elongation laid life safety rope, belay devices, and auxiliary equipment.

1.3.2 This standard shall not apply to rope or equipment for use where specific situations dictate other performance requirements such as mountain rescue, cave rescue, lead climbing operations, recreational use, and industrial fall protection for general industry and the construction and demolition industry.

1.3.3 This edition of NFPA 1983 shall not apply to any life safety rope or system components manufactured to previous editions of this standard.

1.3.4* This standard shall not apply to rope or equipment for operations where personnel are required to work above anchor points.

1.3.5 This standard shall not apply to use requirements for life safety rope and associated life safety rope equipment as those requirements are specified in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

1.3.6 The requirements of this standard shall not apply to any accessories that might be attached to any life safety rope or associated life safety rope equipment.

1.4 Units.

1.4.1 In this standard, values for measurement are followed by an equivalent in parentheses, but only the first stated value shall be regarded as the requirement.

1.4.2 Equivalent values in parentheses shall not be considered as the requirement, as these values are approximate.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publication. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2007 edition.

2.3 Other Publications.

2.3.1 AATCC Publications. American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*, 2010.

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*, 2011.

ASTM D 4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics*, (Martindale Abrasion Tester Method), 2010.

ASTM D 6413, *Standard Test Method for Flame Resistance of Textiles (Vertical Test)*, 2011.

ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, 2006.

ASTM F 1772, *Standard Specification for Climbing Harnesses,* 2005.

ASTM F 1956, *Standard Specification for Rescue Carabiners*, 1999.

ASTM F 2436, *Standard Test Method for Measuring the Performance of Synthetic Rope Rescue Belay Systems Using a Drop Test,* 2005.

ASTM F 2821, *Standard Test Methods for Basket Type Rescue Litters,* 2010.

2.3.3 Cordage Institute Publications. The Cordage Institute, 994 Old Eagle School Road, Suite 1019, Wayne, PA 19087.

CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope*, 2007.

CI 1805, *3-Strand Life Safety Rope, Moderate Stretch*, 2008.

2.3.4 ISO Publications. International Standards Organization, 1 rue de Varembé, Case Postal 56, CH-1211 Geneve 20, Switzerland.

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, 1983.

ISO Guide 62, *General requirements for bodies operating assessment and certification/registration of quality systems*, 1996.

ISO Guide 65, *General requirements for bodies operating product certification systems*, 1996.

ISO 9001, *Quality management systems — requirements*, 2008.

ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*, 2004.

ISO 17025, *General requirements for the competence of testing and calibration laboratories*, 2005.

ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*, 2000.

ISO 22159, *Personal equipment for protection against falls — Descending devices*, 2007.

2.3.5 SAE International Publications. SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001.

SAE-STD-2175A, *Castings, Classification and Inspection of,* 2010.

2.3.6 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 913, *Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations*, 2006, with revisions through June 13, 2010.

2.3.7 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

MIL-W-83420D, Military Specification: *General Specification for Flexible Wire Rope for Aircraft Control* (25 April 1983).

2.3.8 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

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

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

3.2.5 Shall. Indicates a mandatory requirement.

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

3.2.7 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate re-

quirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions shall be located in an appendix or annex, footnote, or fine-print note and are not to be considered a part of the requirements of a standard.

3.3 General Definitions.

3.3.1 Adjusting Device. See 3.3.18.1.

3.3.2 Ascending Device. See 3.3.18.2.

3.3.3 Attachment Point.

3.3.3.1* ***Load-Bearing Attachment Point.*** Point on a harness, or escape belt that is used for connection to an anchor system that will provide full support and fall arrest for the designed load.

3.3.3.2* ***Positioning Attachment Point.*** Point on a harness or belt that is used for connection to an anchor system that will support a person's weight for work at height.

3.3.4 Auxiliary Equipment. Equipment items that are load-bearing and designed to be utilized with life safety rope and harness, such as ascending devices, carabiners, descent control devices, rope grab devices, and snap-links.

3.3.5 Belay Device. See 3.3.18.3

3.3.6 Belay System. A belay device and any other components required for the belay device to function.

3.3.7 Belt. An equipment item configured as a device that fastens around the waist only and designated as a ladder belt or an escape belt.

3.3.7.1* ***Escape Belt.*** A compliant equipment item that is intended for use by the wearer only as an emergency self-rescue device.

3.3.7.2 ***Ladder Belt.*** A compliant equipment item that is intended for use as a positioning device for a person on a ladder.

3.3.8 Block Creel Construction. See 3.3.64.1.

3.3.9 Buckle. A load-bearing connector that is an integral part of an auxiliary equipment item and used to connect two pieces of webbing.

3.3.10 Carabiner. An auxiliary equipment system item; load-bearing connector with a self-closing gate used to join other components of life safety rope.

3.3.11 Certification/Certified. A system whereby a certification organization determines that a manufacturer has demonstrated the ability to produce a product that complies with the requirements of this standard, authorizes the manufacturer to use a label on listed products that comply with the requirements of this standard, and establishes a follow-up program conducted by the certification organization as a check on the methods the manufacturer uses to determine compliance with the requirements of this standard.

3.3.12 Certification Organization. An independent, third-party organization that determines product compliance with the requirements of this standard with a labeling/listing/follow-up program.

3.3.13 Compliant. Certified as meeting or exceeding all applicable requirements of this standard.

3.3.14 Continuous Filament Fiber. See 3.3.30.1.

3.3.15 Corrosion. A condition exhibiting any signs of deterioration, including pitting or loss of metal.

3.3.16 Descent Control Device. See 3.3.18.4.

3.3.17 Design Load. See 3.3.44.1.

3.3.18 Device.

3.3.18.1 ***Adjusting Device.*** An auxiliary equipment system component; a connector device that allows adjustment to be made to a piece of equipment.

3.3.18.2* ***Ascending Device.*** A type of rope grab; auxiliary equipment; a friction or mechanical device utilized to allow ascending a fixed line.

3.3.18.3 ***Belay Device.*** An auxiliary equipment item used to catch a falling load by grabbing the rope.

3.3.18.4 ***Descent Control Device.*** An auxiliary equipment item; a friction or mechanical device utilized with rope to control descent.

3.3.18.4.1 ***Escape Descent Control Device.*** An auxiliary equipment system component; a friction or mechanical device utilized with escape line to control descent.

3.3.18.5* ***Escape Anchor Device.*** An auxiliary equipment device that connects to the structure and supports an escape line.

3.3.18.6 ***Rope Grab Device.*** An auxiliary equipment device used to grasp a life safety rope for the purpose of supporting loads; includes ascending devices.

3.3.18.7 ***Victim Extrication Device.*** A device designed to be secured about the body of a victim in a harness-like manner to provide support in a head-up or horizontal configuration for the purpose of lifting and transporting the victim with a life safety rope.

3.3.19 Diameter (Rope). See 3.3.64.2.

3.3.20 Elongation. The increase in length, expressed in a percent of the original gauge length, that occurs in a sample of new rope when tested as specified herein.

3.3.21 End-to-End Load Straps. See 3.3.47.1

3.3.22 Escape. Immediate self-rescue of a single fire or emergency services person from a life-threatening emergency situation, generally above ground, using system components or manufactured systems designed for self-rescue escape.

3.3.23 Escape Anchor Device. See 3.3.18.5

3.3.24 Escape Belt. See 3.3.7.1.

3.3.25 Escape Descent Control Device. See 3.3.18.4.1.

3.3.26 Escape Rope. See 3.3.64.3.

3.3.27 Escape System. A system designed to provide a means of escape from an immediately hazardous environment, above grade, and intended only for emergency self-rescue.

3.3.27.1 ***Fire Escape System.*** A system designed to be used for the purpose of self-rescue from an immediately hazardous environment involving elevated temperatures.

3.3.27.2 ***Non-Fire Escape System.*** A system designed to be used for the purpose of self-rescue from an immediately hazardous environment.

3.3.28 Escape Webbing. See 3.3.77.1

3.3.29 Fall Factor. A measure of fall severity calculated by dividing the distance fallen by the length of rope used to arrest the fall. *(See A.1.3.4.)*

3.3.30 Fiber.

3.3.30.1 ***Continuous Filament Fiber.*** Fiber of indefinite or unmeasurable length.

3.3.30.2 ***Virgin Fiber.*** Fiber that is new and previously unused.

3.3.31 Fire Escape Rope. See 3.3.64.3.1

3.3.32 Fire Escape System. See 3.3.27.1

3.3.33 Fire Escape Webbing. See 3.3.77.2

3.3.34 Follow-Up Program. The sampling, inspections, tests, or other measures conducted by the certification organization on a periodic basis to determine the continued compliance of labeled and listed products that are being produced by the manufacturer to the requirements of this standard.

3.3.35* General Use. One designation of equipment item or manufactured systems designed for general use loads, technical use loads, and escape based on design loads that are calculated and understood.

3.3.36 Hardware. Nonfabric components of protective clothing or equipment including, but not limited to, those made of metal or plastic.

3.3.37 Harness. See 3.3.40, *Life Safety Harness.*

3.3.38 Impact Load. See 3.3.44.2.

3.3.39 Ladder Belt. See 3.3.7.2.

3.3.40 Life Safety Harness. An equipment item; an arrangement of materials secured about the body used to support a person.

3.3.41 Life Safety Rope. See 3.3.64.4.

3.3.42 Line. See 3.3.64.5 and 3.3.77.

3.3.43 Litter. An apparatus, also called a stretcher, designed to secure, protect and transport a patient vertically or horizontally.

3.3.44 Load.

3.3.44.1* ***Design Load.*** The load for which a given piece of equipment or manufactured system was engineered for under normal static conditions.

3.3.44.2* ***Impact Load.*** Sudden application of a force, which causes kinetic energy and momentum to be converted into other forms of energy.

3.3.44.3* ***Proof Load.*** The application of force to a material as a nondestructive test to verify the performance of that material.

3.3.45 Load-Bearing Attachment Point. See 3.3.3.1.

3.3.46 Load-Bearing Connector. An auxiliary equipment system component; a device used to join other system components including, but not limited to, carabiners, rings, quick links, and snap-links.

3.3.47 Load Straps.

3.3.47.1 ***End-to-End Load Straps.*** Straps with end connection points meant to be loaded in end-to-end fashion, including, but not limited to, pick-off straps, load-releasing straps, or vertical lifting straps.

3.3.47.2* ***Multiple Configuration Load Straps.*** Straps with end connection points that can be configured in multiple loading, including, but not limited to, end-to-end, basket, and choker configurations.

3.3.48 Lot.

3.3.48.1 ***Manufacturer's Lot.*** An identifiable series of products that can be the same as or a subset of a production lot; used by the manufacturer for quality control or identification purposes.

3.3.48.2 ***Production Lot.*** An identifiable series of products manufactured with identical design specifications and identical materials and produced without any alterations to technique or procedure.

3.3.49 Manufactured System. Preassembled system sold as a unit by the manufacturer and tested as a complete assembly.

3.3.50 Manufacturer. The entity that directs and controls any of the following: compliant product design, compliant product manufacturing, or compliant product quality assurance; or the entity that assumes the liability for the compliant product or provides the warranty for the compliant product.

3.3.51* Manufacturer-Supplied Eye Termination. A point of fixed or permanent connection to compliant escape line, life safety rope, throwline, or moderate elongation laid rope, other than a knot, provided by the manufacturer for the purpose of connecting a load to a compliant product.

3.3.52 Manufacturer's Lot. See 3.3.48.1.

3.3.53 Melt. A response to heat by a material resulting in evidence of flowing or dripping.

3.3.54 Minimum Breaking Strength (MBS). The result of subtracting three standard deviations from the mean result of the lot being tested using the formula in 8.2.5.2.

3.3.55 Moderate Elongation Laid Life Saving Rope. 3.3.64.4.1.

3.3.56 Multiple Configuration Load Straps. See 3.3.47.2

3.3.57 Non-Fire Escape System. See 3.3.27.2

3.3.58* Portable Anchor. A manufactured device with rigid arms, legs, or both designed to support human loads.

3.3.59 Positioning Attachment Point. See 3.3.3.2.

3.3.60* Product Label. A label or marking affixed to a product by the manufacturer that provides general information, warnings, instructions for care and maintenance, and other information.

3.3.61 Production Lot. See 3.3.48.2.

3.3.62 Proof Load. See 3.3.44.3.

3.3.63 Ring. An auxiliary equipment system component; an ungated load-bearing connector.

3.3.64 Rope. A compact but flexible, torsionally balanced, continuous structure of fibers produced from strands that are twisted, plaited, or braided together and that serve primarily to support a load or transmit a force from the point of origin to the point of application.

3.3.64.1* ***Block Creel Construction.*** Rope constructed without knots or splices in the yarns, ply yarns, strands or braids, or rope.

3.3.64.2 ***Diameter (Rope).*** The length of a straight line through the center of the cross section of the rope.

3.3.64.3 ***Escape Rope.*** A single-purpose, emergency self-escape (self-rescue) rope; not classified as a life safety rope.

3.3.64.3.1 ***Fire Escape Rope.*** An emergency self-rescue rope used to escape an immediately hazardous environment involving fire or fire products; not classified as a life safety rope.

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

3.3.64.4.1 ***Moderate Elongation Laid Life Saving Rope.*** Rope dedicated solely for the purpose of supporting people during rescue at fire-fighting operations or training evolutions.

3.3.64.5 ***Line.*** Rope when in use.

3.3.64.5.1 ***Throwline.*** A floating rope that is intended to be thrown to a person during water rescues or as a tether for rescuers entering the water.

3.3.65 Rope Grab Device. See 3.3.18.6.

3.3.66 Sample. The element, item, component, or composite that is conditioned for subsequent testing. An amount of the material, product, or assembly to be tested that is representative of the item as a whole. *(See also 3.3.70, Specimen.)*

3.3.67 Self-Destructive Action. Interaction of materials in a manner that leads to deterioration.

3.3.68 Snap-Link. An auxiliary equipment system component; a self-closing, gated, load-bearing connector.

3.3.69 Software. A type of auxiliary equipment that includes, but is not limited to, anchor straps, pick-off straps, and rigging slings.

3.3.70 Specimen. The conditioned element, item, component, or composite that is tested. Specimens are taken from samples. *(See also 3.3.66, Sample.)*

3.3.71* Standard Deviation. A parameter that indicates the way in which a probability function is centered around its mean.

3.3.72* Technical Use. One designation of an equipment item or manufactured systems designed for technical use loads, and escape based on design loads that are calculated and understood.

3.3.73 Throwline. See 3.3.64.5.1.

3.3.74 Victim Extrication Device. See 3.3.18.7.

3.3.75 Virgin Fiber. See 3.3.30.2.

3.3.76 Waist. The area above the hips and below the xiphoid process.

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

3.3.77.1 ***Escape Webbing.*** A single-purpose, emergency self-escape (self-rescue) webbing.

3.3.77.2 ***Fire Escape Webbing.*** A single-purpose, emergency self-escape (self-rescue) webbing to be used to escape an immediately hazardous environment involving fire or fire products.

Chapter 4 Certification

4.1 General.

4.1.1 The process of certification for product as being compliant with NFPA 1983 shall meet the requirements of Section 4.1, General; Section 4.2, Certification Program; Section 4.3, Inspection and Testing; Section 4.4, Recertification; Section 4.5, Manufacturer's Quality Assurance Program; Section 4.6, Hazards Involving Compliant Product; Section 4.7, Manufacturers' Investigation of Complaints and Returns; and Section 4.8, Manufacturers' Safety Alert and Product Recall Systems.

4.1.2 All product labeled as being compliant with this standard shall meet or exceed all applicable requirements specified in this standard and shall be certified.

4.1.3 All certification shall be performed by a certification organization that meets at least the requirements specified in Section 4.2, Certification Program, and that is accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems.* The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies.*

4.1.4 Manufacturers shall not claim compliance with portions or segments of the requirements of this standard and shall not use the NFPA name or the name or identification of this standard, NFPA 1983, in any statements about their respective products unless the products are certified as compliant to this standard.

4.1.5 All compliant products shall be labeled and listed.

4.1.6 All compliant products shall also have a product label that meets the requirements specified in Section 5.1, Product Label Requirements.

4.1.7* The certification organization's label, symbol, or identifying mark shall be part of the product label, shall be attached to the product label, or shall be immediately adjacent to the product label.

4.1.8 The certification organization shall not issue any new certifications to the 2006 edition of NFPA 1983, *Standard on Fire Service Life Safety Rope and Equipment for Emergency Services*, on or after the NFPA effective date for the 2012 edition which is January 2, 2012.

4.1.9 The certification organization shall not permit any manufacturer to continue to label any protective ensembles or ensemble elements that are certified as compliant with the 2006 edition of NFPA 1983, *Standard on Fire Service Life Safety Rope and Equipment for Emergency Services*, after January 2, 2013.

4.1.10 The certification organization shall require manufacturers to remove all certification labels and product labels indicating compliance with the 2006 edition of NFPA 1983, *Standard on Fire Service Life Safety Rope and Equipment for Emergency Services*, from all protective ensembles and ensemble elements that are under the control of the manufacturer on January 2, 2013, and the certification organization shall verify this action is taken.

4.2 Certification Program.

4.2.1* The certification organization shall not be owned or controlled by manufacturers or vendors of the product being certified.

4.2.2 The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product's ultimate profitability.

4.2.3 The certification organization shall be accredited for personal protective equipment in accordance with ISO 65, *General requirements for bodies operating product certification systems.* The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies.*

4.2.4 The certification organization shall refuse to certify products to this standard that do not comply with all applicable requirements of this standard.

4.2.5* The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all applicable requirements of this standard.

4.2.5.1 The certification organization shall not offer or confer any conditional, temporary, or partial certifications.

4.2.5.2 Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all applicable requirements of this standard.

4.2.6* The certification organization shall have laboratory facilities and equipment available for conducting proper tests to determine product compliance.

4.2.6.1 The certification organization laboratory facilities shall have a program in place and functioning for calibration of all instruments, and procedures shall be in use to ensure proper control of all testing.

4.2.6.2 The certification organization laboratory facilities shall follow good practice regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.

4.2.7 The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 4.5, Manufacturer's Quality Assurance Program.

4.2.7.1* The certification organization shall require the manufacturer to have a product recall system as specified in Section 4.8, Manufacturers' Safety Alert and Product Recall Systems, as part of the manufacturer's quality assurance program.

4.2.7.2 The certification organization shall audit the manufacturer's quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.

4.2.8 The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.

4.2.9* The certification organization shall have a follow-up inspection program of the manufacturer's facilities of the compliant product with at least two random and unannounced visits per 12-month period to verify the product's continued compliance.

4.2.9.1 As part of the follow-up inspection program, the certification organization shall select sample compliant product at random from the manufacturer's production line, from the manufacturer's in-house stock, or from the open market.

4.2.9.2 Sample product shall be evaluated by the certification organization to verify the product's continued compliance in order to assure that the materials, components, and manufacturing quality assurance systems are consistent with the materials, components, and manufacturing quality assurance that were inspected and tested by the certification organization during initial certification and recertification.

4.2.9.3 The certification organization shall be permitted to conduct specific testing to verify the product's continued compliance.

4.2.9.4 For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown results to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of sample product, components, and materials acquired in accordance with 4.2.9.1 against the applicable requirements of this standard.

4.2.10 The certification organization shall have in place a series of procedures, as specified in Section 4.6, Hazards Involving Compliant Product, that address reports of situations in which a compliant product is subsequently found to be hazardous.

4.2.11 The certification organization's operating procedures shall provide a mechanism for the manufacturer to appeal decisions. The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.

4.2.12 The certification organization shall be in a position to use legal means to protect the integrity of its name and label. The name and label shall be registered and legally defended.

4.3 Inspection and Testing.

4.3.1 For both initial certification and recertification of compliant products, the certification organization shall conduct both inspection and testing as specified in this section.

4.3.2 All inspections, evaluations, conditioning, and testing for certification or for recertification shall be conducted by a certification organization's testing laboratory that is accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories.*

4.3.2.1 The certification organization's testing laboratory's scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories,* shall encompass testing of personal protective equipment.

4.3.2.2 The accreditation of a certification organization's testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies.*

4.3.3 A certification organization shall be permitted to utilize conditioning and testing results conducted by a product or component manufacturer for certification or recertification provided the manufacturer's testing laboratory meets the requirements specified in 4.3.3.1 through 4.3.3.5.

4.3.3.1 The manufacturer's testing laboratory shall be accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories.*

4.3.3.2 The manufacturer's testing laboratory's scope of accreditation to ISO 17025, *General requirements for the competence*

of testing and calibration laboratories, shall encompass testing of personal protective equipment.

4.3.3.3 The accreditation of a manufacturer's testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *General requirements for accreditation bodies accrediting conformity assessment bodies*.

4.3.3.4 The certification organization shall approve the manufacturer's testing laboratory.

4.3.3.5 The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for certification or recertification conducted at the manufacturer's testing laboratory.

4.3.4 Sampling levels for testing and inspection shall be established by the certification organization and the manufacturer to ensure a reasonable and acceptable reliability at a reasonable and acceptable confidence level that products certified to this standard are compliant, unless such sampling levels are specified herein.

4.3.5 Inspection by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information are at least as specified for the products identified in Section 5.1, Product Label Requirements.

4.3.6 Inspection by the certification organization shall include an evaluation of any symbols and pictorial graphic representations used on product labels or in user information, as permitted by in 5.1.1.6, 5.1.2.6, 5.1.3.8, 5.1.4.8, 5.1.5.7, and 5.1.6.6, to ensure that the symbols are clearly explained in the product's user information package.

4.3.7 Inspection by the certification organization shall include a review of the user information required by Section 5.2, User Information, to ensure that the information has been developed and is available.

4.3.8 Inspection by the certification organization for determining compliance with the design requirements specified in Chapter 6 shall be performed on whole or complete products.

4.3.9 Testing to determine product compliance with the performance requirements specified in Chapter 7 shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 8.

4.3.9.1 Testing shall be performed on specimens representative of materials and components used in the actual construction of the compliant product.

4.3.9.2 The certification organization also shall be permitted to use sample materials cut from a representative product.

4.3.10 The certification organization shall accept from the manufacturer, for evaluation and testing for certification, only product or product components that are the same in every respect to the actual final product or product component.

4.3.11 The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product's submission for evaluation and testing by the certification organization.

4.3.12 The certification organization shall not allow the substitution, repair, or modification, other than as specifically permitted herein, of any product or any product component during testing.

4.3.13 The certification organization shall not allow test specimens that have been conditioned and tested for one method to be reconditioned and tested for another test method unless specifically permitted in the test method.

4.3.14 Any change in the design, construction, or material of a compliant product shall necessitate new inspection and testing to verify compliance to all applicable requirements of this standard that the certification organization determines can be affected by such change. This recertification shall be conducted before labeling the modified product as being compliant with this standard.

4.3.15 The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the certification of the manufacturer's compliant product. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.4 Recertification.

4.4.1 All products that are labeled as being compliant with this standard shall undergo recertification in accordance with Table 4.4.1.

4.4.1.1 This recertification shall include inspection and evaluation to the design requirements and testing to the performance requirements as required by this standard on all manufacturers' compliant product models.

4.4.1.2 Any change that affects the compliant product performance under design or performance requirements of this standard shall constitute a different model.

4.4.1.3 For the purpose of this standard, models shall include each unique pattern, style, or design of the compliant products.

4.4.2 Samples of manufacturer's models and components for recertification shall be acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up program specified in 4.2.9.

4.4.2.1 For recertification, the certification organization shall acquire at least one complete compliant product.

4.4.2.2 The certification organization shall also acquire a sufficient quantity of components to be tested for recertification as required by 4.4.3.

4.4.3 Compliant products and components shall be inspected, evaluated, and tested as specified in 4.4.3.1 and 4.4.3.2. Inspection, evaluation, and testing performed as part of the follow-up program shall be permitted to be used for recertification to avoid duplication.

4.4.3.1 One sample of each compliant product shall be inspected and evaluated to the design requirements specified in Chapter 6.

4.4.3.2 One sample of each compliant product and component shall be tested for overall performance as specified in Chapter 7.

4.4.4 The manufacturer shall maintain all design, inspection, performance, and test data from the certification organization produced during the recertification of the manufacturer's models and components. The manufacturer shall provide such data upon request to the purchaser or to the authority having jurisdiction (AHJ).

Table 4.4.1 Recertification Schedule

Product	Test	Time
All component product	Corrosion testing	Initial cert only
All component product	Product label durability tests	Initial cert only
Life safety rope	Rope breaking and elongation	Every year
Escape rope	Rope breaking and elongation	Every year
Water rescue throwlines	Rope breaking	Every year
Water rescue throwlines	Floatability	Every year
Life safety harness	Static	Alternating years with drop test
Life safety harness	Drop	Alternating years with static test
Belt	Static	Alternating years with drop test
Belt	Drop	Alternating years with static test
Auxiliary equipment carabiners and snap-link	All	Every 2 years
Auxiliary equipment rope grab devices	All	Every 2 years
Auxiliary equipment system descent control devices — auto stop	Passive brake holding test	Every year
Auxiliary equipment components descent control devices — auto stop	Manner of function	Every year
Auxiliary equipment descent control descent control devices — non-auto stop	All	Every 2 years
Auxiliary equipment portable anchor	All	Initial cert only
Auxiliary equipment pulley	All	Every 2 years
Auxiliary equipment pick-off, anchor and rigging strap	Breaking strength	Every year
Auxiliary equipment manufactured systems	All	Every year
Life safety rope	Diameter, rope breaking, and elongation	
Life safety rope fibers	Melting and crystallization temperatures by thermal analysis	Every year
Escape rope	Diameter, rope breaking, and elongation	
Fire escape rope	Elevated rope temperature test	Every year
Escape rope fibers	Melting and crystallization temperatures by thermal analysis	Every year
Escape webbing	Perimeter, rope breaking, and elongation	Every year
Fire escape webbing	Elevated rope temperature test	Every year
Escape webbing fibers	Melting and crystallization temperatures by thermal analysis	Every year
Fire escape webbing	Elevated rope temperature test	Every year
Escape webbing fibers	Melting and crystallization temperatures by thermal analysis	Every year
Victim extrication devices	Static	Every 2 years
Litters	Litter strength test — vertical	Initial only
	Litter strength test — horizontal	Initial only
Load-bearing textiles used in victim extrication devices	Melting and crystallization temperatures by thermal analysis	Every year
Thread used in victim extrication devices	Melting and crystallization temperatures by thermal analysis	Every year
Webbing components	Melting and crystallization temperatures by thermal analysis	Every year
Thread components	Melting and crystallization temperatures by thermal analysis	Every year
Escape webbing fibers	Melting and crystallization temperatures by thermal analysis	Every year
Load-bearing textiles used in belts with optional flame resistance	Flame resistance	Every year
Load-bearing textiles used in belts with optional flame resistance	Heat resistance	Every year
Hardware installed in belts with optional flame resistance	Heat resistance	Every year
Thread used in belts with optional flame resistance	Thread heat resistance	Every year
Load-bearing textiles used in life safety harnesses with optional flame resistance	Flame resistance	Every year
Load-bearing textiles used in life safety harnesses with optional flame resistance	Flame resistance	Every year
Load-bearing textiles used in life safety harnesses with optional flame resistance	Heat resistance	Every year
Hardware installed in life safety harnesses with optional flame resistance	Heat resistance	Every year
Thread used in life safety harnesses with optional flame resistance	Thread heat resistance	Every year
Manufacturer-supplied eye termination	Breaking strength	Every year
Manufacturer-supplied eye termination	Thread melting	Every year

4.5 Manufacturer's Quality Assurance Program.

4.5.1 The manufacturer shall provide and operate a quality assurance program that meets the requirements of this section and that includes a product recall system as specified in 4.2.7.1, and Section 4.8, Manufacturers' Safety Alert and Product Recall Systems.

4.5.2 The operation of the quality assurance program shall evaluate and test compliant product production to the requirements of this standard to assure production remains in compliance.

4.5.3 The manufacturer shall be registered to ISO 9001, *Quality management systems — requirements*.

4.5.3.1 Registration to the requirements of ISO 9001, *Quality management systems — requirements*, shall be conducted by a registrar that is accredited for personal protective equipment in accordance with ISO Guide 62, *General requirements for bodies operating assessment and certification/registration of quality systems*. The registrar shall affix the accreditation mark on the ISO registration certificate.

4.5.3.2 The scope of the ISO registration shall include at least the design and manufacturing systems management for the type of personal protective equipment being certified.

4.5.4* Any entity that meets the definition of *manufacturer* specified in Section 3.3, General Definitions, and therefore is considered the "manufacturer," but does not manufacture or assemble the compliant product, shall meet the requirements specified in this Section 4.5.

4.5.5* Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all subcontractor facilities shall be documented and the documentation shall be provided to the manufacturer's ISO registrar and to the certification organization.

4.6 Hazards Involving Compliant Product.

4.6.1* The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, and as modified herein.

4.6.2* Where a report of a hazard involved with a compliant product is received by the certification organization, the validity of the report shall be investigated.

4.6.3 With respect to a compliant product, a hazard shall be a condition or create a situation that results in exposing life, limb, or property to an imminently dangerous or dangerous condition.

4.6.4 Where a specific hazard is identified, the determination of the appropriate action for the certification organization and the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.

4.6.5 Where it is established that a hazard is involved with a compliant product, the certification organization shall determine the scope of the hazard including products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.

4.6.6 The certification organization's investigation shall include, but not be limited to, the extent and scope of the problem as it might apply to other compliant products or compliant product components manufactured by other manufacturers or certified by other certification organizations.

4.6.7 The certification organization shall also investigate reports of a hazard where compliant product is gaining widespread use in applications not foreseen when the standard was written, such applications in turn being ones for which the product was not certified, and no specific scope of application has been provided in the standard, and no limiting scope of application was provided by the manufacturer in written material accompanying the compliant product at the point of sale.

4.6.8 The certification organization shall require the manufacturer of the compliant product, or the manufacturer of the compliant product component if applicable, to assist the certification organization in the investigation and to conduct its own investigation as specified in Section 4.7, Manufacturers' Investigation of Complaints and Returns.

4.6.9 Where the facts indicating a need for corrective action are conclusive and the certification organization's appeal procedures referenced in 4.2.11 have been followed, the certification organization shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.

4.6.10 Where the facts are conclusive and corrective action is indicated, but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or the manufacturer is bankrupt, the certification organization shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.11* Where the facts are conclusive and corrective action is indicated, the certification organization shall take one or more of the following corrective actions:

(1) Notification of parties authorized and responsible for issuing a safety alert when, in the opinion of the certification organization, such a notification is necessary to inform the users.
(2) Notification of parties authorized and responsible for issuing a product recall when, in the opinion of the certification organization, such a recall is necessary to protect the users.
(3) Removal of the mark of certification from the product.
(4) Where a hazardous condition exists and it is not practical to implement (1), (2), or (3); or the responsible parties refuse to take corrective action, the certification organization shall notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.12 The certification organization shall provide a report to the organization or individual identifying the reported hazardous condition and notify that organization or individual of the corrective action indicated, or that no corrective action is indicated.

4.6.13* Where a change to an NFPA standard(s) is felt to be necessary, the certification organization shall also provide a copy of the report and corrective actions indicated to NFPA and shall also submit either a Public Proposal for a proposed change to the next revision of the applicable standard or a proposed Temporary Interim Amendment (TIA) to the current edition of the applicable standard.

4.7 Manufacturers' Investigation of Complaints and Returns.

4.7.1 Manufacturers shall provide corrective action in accordance with ISO 9001, *Quality management systems — requirements*, for investigating written complaints and returned products.

4.7.2 Manufacturers' records of returns and complaints related to safety issues shall be retained for at least 5 years.

4.7.3 Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component can constitute a potential safety risk to end users that is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact the certification organization and provide all information about its review to assist the certification organization with the investigation.

4.8 Manufacturers' Safety Alert and Product Recall Systems.

4.8.1 Manufacturers shall establish a written safety alert system and a written product recall system that describes the procedures to be used in the event that it decides, or is directed by the certification organization, to either issue a safety alert or to conduct a product recall.

4.8.2 The manufacturers' safety alert and product recall system shall provide the following:

(1) The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls
(2) A method of notifying all dealers, distributors, purchasers, users, and NFPA about the safety alert or product recall that can be initiated within a 1-week period following the manufacturer's decision to issue a safety alert or to conduct a product recall, or after the manufacturer has been directed by the certification organization to issue a safety alert or conduct a product recall
(3) Techniques for communicating accurately and understandably the nature of the safety alert or product recall and in particular the specific hazard or safety issue found to exist
(4) Procedures for removing product that is recalled and for documenting the effectiveness of the product recall
(5) A plan for repairing, replacing, or compensating purchasers for returned product

Chapter 5 Labeling and Information

5.1 Product Label Requirements.

5.1.1 Life Safety Rope.

5.1.1.1 Each life safety rope item shall have a product label.

5.1.1.2 Where life safety rope is an integral and nonseparable piece of a manufactured system and that manufactured system is certified as compliant with this standard, the life safety rope shall be required to have at least the continuous identification tape specified in 5.1.1.13.

5.1.1.3 The life safety rope product label shall be permitted to be a hang tag affixed to each individual life safety rope or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the life safety rope.

5.1.1.4 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.1.5 All worded portions of the required product label shall at least be in English.

5.1.1.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.1.7 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.1.8* Each life safety rope shall have the following compliance statement on the product label:

"THIS ROPE MEETS THE LIFE SAFETY ROPE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION.

CLASS: _____-USE ROPE"

5.1.1.9 The class designation of the life safety rope that is required in 5.1.1.8 to be stated on the product label shall be as determined by the certification organization in accordance with Section 7.1.

5.1.1.10 In addition to the compliance statement specified in 5.1.1.8, at least the following information shall be provided on the product label:

"MINIMUM BREAKING STRENGTH: _____ kN
DIAMETER: _____ mm

Type of fiber(s) _____"

5.1.1.11 The minimum breaking strength value of the life safety rope, which is required in 5.1.1.10 to be stated on the product label, shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing in accordance with 7.1.1 or 7.1.2, as applicable, but shall not be greater than the calculated minimum breaking strength.

5.1.1.12 The diameter of the life safety rope, which is required in 5.1.1.10 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.1.3 or 7.1.4, as applicable.

5.1.1.13* In addition to the compliance statement specified in 5.1.1.8, each life safety rope shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.).

"MEETS REQUIREMENTS FOR LIFE SAFETY ROPE OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.1.14 In addition to the compliance and information statements in 5.1.1.8, 5.1.1.10, and 5.1.1.13, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number
(6) Elongation at 1.35 kN (300 lbf)
(7) Elongation at 2.7 kN (600 lbf)
(8) Elongation at 4.4 kN (1000 lbf)

5.1.2 Escape Rope.

5.1.2.1* Each escape rope item shall have a product label.

5.1.2.2* Where escape rope is an integral and nonseparable piece of a manufactured system and that manufactured system is certified as compliant with this standard, the escape rope shall be required to have at least the continuous identification tape specified in 5.1.2.12.

5.1.2.3 The escape rope product label shall be permitted to be a hang tag affixed to each escape rope or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the escape rope.

5.1.2.4 All letters shall be at least 1.6 mm (1⁄16 in.) high.

5.1.2.5 All worded portions of the required product label shall at least be in English.

5.1.2.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.2.7 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.2.8 Each escape rope shall have the following compliance statement on the product label.

"THIS ROPE MEETS THE ESCAPE ROPE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.2.9* In addition to the compliance statement specified in 5.1.2.8, at least the following information shall be provided on the product label.

"MINIMUM BREAKING STRENGTH: _____ kN
DIAMETER: _____ mm
Type of fiber(s) _____"

5.1.2.10 The minimum breaking strength value of the escape rope, which is required in 5.1.2.9 to be stated on the product label, shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing in accordance with 7.2.1, but shall not be greater than the calculated minimum breaking strength.

5.1.2.11 The diameter of the escape rope, which is required in 5.1.2.9 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.2.2.

5.1.2.12* In addition to the compliance statement specified in 5.1.2.8, each escape rope shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.):

"MEETS REQUIREMENTS FOR ESCAPE ROPE OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.2.13 In addition to the compliance and information statements in 5.1.2.9, 5.1.2.10, and 5.1.2.12 at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number
(6) Elongation at 1.35 kN (300 lb)
(7) Elongation at 2.7 kN (600 lb)
(8) Elongation at 4.4 kN (1000 lb)

5.1.3 Life Safety Harness.

5.1.3.1 Each life safety harness item shall have a product label.

5.1.3.2 Harnesses used in manufactured systems shall be required to be individually labeled.

5.1.3.3 Harness product labels shall be embossed, printed, sewn, stapled, riveted, or otherwise permanently attached to the harness.

5.1.3.4 Harness product labels shall be conspicuously located on each harness when the harness is properly assembled with all components in place.

5.1.3.5 All letters shall be at least 2 mm (5⁄64 in.) high

5.1.3.6 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.3.7 All worded portions of the required product label shall at least be in English.

5.1.3.8 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.3.9 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.3.10 Where the life safety harness is certified as compliant with only the nonoptional requirements of the standard and is not certified with the optional flame resistance requirements, the following statement shall be printed legibly on the product label:

"THIS LIFE SAFETY HARNESS MEETS THE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION, CLASS _____. THIS HARNESS IS NOT FLAME-RESISTANT! DO NOT REMOVE THIS LABEL!"

5.1.3.11 Where the life safety harness is certified as compliant with nonoptional requirements of this standard and also certified as compliant with the optional flame resistance requirements specified in 6.3.9, the following statement shall be printed legibly on the product label:

"THIS LIFE SAFETY HARNESS MEETS THE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION, AND THE OPTIONAL FLAME RESISTANCE REQUIREMENTS OF NFPA 1983, CLASS _____. DO NOT REMOVE THIS LABEL!"

5.1.3.12* In addition to the compliance statement specified in 5.1.3.10 or 5.1.3.11, at least the following information shall be provided on the product label:

(1) For Class II harness: **"Fits waist size _____"**
(2) For one-piece Class III harness: **"Fits waist size _____, Fits height _____"** or **"Fits chest size _____, Fits height _____"**
(3) For multiple-piece Class III harness: **"Fits waist size _____, Fits height _____"** or **"Fits chest size _____, Fits height _____"**

This is one part of a multiple-piece harness and must be used in conjunction with component part number ___ in order to fully meet the criteria of Class ___ harness."

5.1.3.13 The class designation of the life safety harness required to be stated on the product label(s) shall be as determined by the certification organization in accordance with 6.3.1.

5.1.3.14 In addition to the compliance and information statements in 5.1.3.10, 5.1.3.12, and 5.1.3.15, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.3.15 Where detachable components must be used with a life safety harness in order for the life safety harness to be compliant with this standard, at least the following statement and information shall also be printed legibly on the product label of the life safety harness. All letters shall be at least 2.5 mm (3⁄32 in.) high. The detachable component(s) shall be listed following the statement by type, identification, and how properly used.

"TO BE COMPLIANT WITH NFPA 1983, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED IN CONJUNCTION WITH THIS LIFE SAFETY HARNESS:"
[The detachable component(s) shall be listed here.]

5.1.4 Belts.

5.1.4.1 Each belt item shall have a product label.

5.1.4.2 Belts used in manufactured systems shall be required to be individually labeled.

5.1.4.3 Belt product labels shall be embossed, printed, sewn, stapled, riveted, or otherwise permanently attached to the belt.

5.1.4.4 Belt product labels shall be conspicuously located on each belt when the belt is properly assembled with all components in place.

5.1.4.5 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.4.6 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.4.7 All worded portions of the required product label shall at least be in English.

5.1.4.8 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.4.9 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.4.10 Where the belt is certified as compliant with only the nonoptional requirements of the standard and is not certified with the optional flame resistance requirements, the following statement shall be printed legibly on the product label:

"THIS BELT MEETS THE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION, TYPE _____. THIS BELT IS NOT FLAME-RESISTANT! DO NOT REMOVE THIS LABEL!"

5.1.4.11 Where the belt is certified as compliant with nonoptional requirements of this standard and also certified as compliant with the optional flame resistance requirements specified in 6.4.9, the following statement shall be printed legibly on the product label:

"THIS BELT MEETS THE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION, AND THE OPTIONAL FLAME RESISTANCE REQUIREMENTS OF NFPA 1983, TYPE _____. DO NOT REMOVE THIS LABEL!"

5.1.4.12 In addition to the compliance statement specified in 5.1.4.10 or 5.1.4.11, at least the following information shall be provided on the product label:

"Fits waist size _____"

5.1.4.13 The type designation of belt required to be stated on the product label shall be as determined by the certification organization in accordance with 6.4.1.

5.1.4.14 In addition to the compliance and information statements in 5.1.4.10, 5.1.4.12, and 5.1.4.15, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.4.15 Where detachable components must be used with the belt in order for the belt to be compliant with this standard, at least the following statement and information shall also be printed legibly on the product label of the belt. All letters shall be at least 2.5 mm (3⁄32 in.) high. The detachable component(s) shall be listed following the statement by type, identification, and how properly used.

"TO BE COMPLIANT WITH NFPA 1983, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED IN CONJUNCTION WITH THIS BELT:"
[The detachable component(s) shall be listed here.]

5.1.5 Auxiliary Equipment.

5.1.5.1 Each auxiliary equipment item shall have a product label.

5.1.5.2 Each load-bearing hardware auxiliary equipment item shall have a product label stamped, engraved, or otherwise permanently marked with the portions of the product label information specified in 5.1.5.2.1 through 5.1.5.2.5.

5.1.5.2.1 Each load-bearing hardware auxiliary equipment item shall have the following compliance statement:

"MEETS NFPA 1983 (2012 ED)."

5.1.5.2.2 Each load-bearing hardware auxiliary equipment shall display the mark or logo of the certification organization and the manufacturer's name or identifying mark.

5.1.5.2.3 Each load-bearing hardware auxiliary equipment shall display at least the minimum rated breaking strength prefaced by the letters "MBS." The minimum breaking strength value stated on the product label shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing, but shall not be greater than the calculated minimum breaking strength.

5.1.5.2.4 Each load-bearing hardware auxiliary equipment shall display a "G" for general use items, a "T" for technical use items, or an "E" for escape use items. The designation "G," "T," or "E" shall be designated in accordance with 6.5.2.

5.1.5.2.5 Each auxiliary equipment ascending device, rope grab device, and descent control device shall also display the range of rope diameters with which the device is intended to be used.

5.1.5.3 The product label for the portions of the product label information not specified in 5.1.5.2.1 through 5.1.5.2.5 shall be permitted to be a hang tag affixed to each individual auxiliary equipment item or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the auxiliary equipment item.

5.1.5.4 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.5.5 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.5.6 All worded portions of the required product label shall at least be in English.

5.1.5.7 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.5.8 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.5.9 Each auxiliary equipment item shall have the following compliance statement on the product label.

"THIS [insert name of equipment item here] MEETS THE AUXILIARY EQUIPMENT REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.5.10 In addition to the compliance statement specified in 5.1.5.9, at least the information required in 5.1.5.2.3 through 5.1.5.2.5 shall also be provided on the printed product label.

5.1.5.11 In addition to the compliance statement specified in 5.1.5.9, portable anchor auxiliary equipment devices shall include the following additional information on the product label:

"MINIMUM BREAKING STRENGTH AND RATING ARE DETERMINED AT THE CONFIGURATION OF LOWEST STRENGTH PER MANUFACTURER'S INSTRUCTIONS."

5.1.5.12 In addition to the compliance statement specified in 5.1.5.9, rigging and anchor straps shall include the following additional statement on the product label:

"MINIMUM BREAKING STRENGTH AND RATING ARE DETERMINED USING A BASKET (U) CONFIGURATION. IN ADDITION, THIS STRAP HAS A MINIMUM BREAKING STRENGTH OF:
_____ kN IN A CHOKER CONFIGURATION
_____ kN WHEN PULLED END TO END."

5.1.5.13 In addition to the compliance and information statements in 5.1.5.9, 5.1.5.10, and 5.1.5.11, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.5.14 Where detachable components must be used with the auxiliary equipment item in order for the auxiliary equipment item to be compliant with this standard, at least the following statement and information shall also be printed legibly on the product label of the item. All letters shall be at least 2 mm (5⁄64 in.) high. The detachable component(s) shall be listed following the statement by type, identification, and how properly used.

"TO BE COMPLIANT WITH NFPA 1983, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED IN CONJUNCTION WITH THIS [insert type of auxiliary equipment here]:"
[The detachable component(s) shall be listed here.]

5.1.6 Throwlines.

5.1.6.1* Each throwline item shall have a product label.

5.1.6.2 Where a throwline is an integral and nonseparable piece of a manufactured system and that manufactured system is certified as compliant with this standard, the throwline shall be required to have at least the continuous identification tape specified in 5.1.6.12.

5.1.6.3 The throwline product label shall be permitted to be a hang tag affixed to each individual throwline or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the throwline.

5.1.6.4 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.6.5 All worded portions of the required product label shall at least be in English.

5.1.6.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.6.7 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.6.8* Each throwline shall have the following compliance statement on the product label:

"THIS ROPE MEETS THE THROWLINE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.6.9 In addition to the compliance statement specified in 5.1.6.8, at least the following information shall be provided on the product label.

"MINIMUM BREAKING STRENGTH: _____ kN
DIAMETER: _____ mm
Type of fiber(s) _____"

5.1.6.10 The minimum breaking strength value of the throwline, which is required in 5.1.6.9 to be stated on the product label, shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing in accordance with 7.3.1, but shall not be greater than the calculated minimum breaking strength.

5.1.6.11 The diameter of the throwline, which is required in 5.1.6.8 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.3.2.

5.1.6.12 In addition to the compliance statement specified in 5.1.6.8, each throwline shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.):

"MEETS REQUIREMENTS FOR THROWLINE OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.6.13 In addition to the compliance and information statements in 5.1.6.8 and 5.1.6.9, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.7 Victim Extrication Device.

5.1.7.1 Each victim extrication device shall have a product label.

5.1.7.2 Each victim extrication device shall have a product label stamped, engraved, or otherwise permanently marked with the portions of the product label information.

5.1.7.2.1 Each victim extrication device shall display the mark or logo of the certification organization , and the manufacturer's name or identifying mark.

5.1.7.3 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.7.4 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.7.5 All worded portions of the required product label shall be at least in English.

5.1.7.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.7.7 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.7.8 Each victim extrication device shall have the following compliance statement on the product label:

"MEETS THE VICTIM EXTRICATION DEVICE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION, CLASS_____."

5.1.7.9 In addition to the compliance and information statements in 5.1.7.8, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.7.10 Where detachable components must be used with a victim extrication device in order for the device to be compliant with this standard, at least the following statement and information shall also be printed legibly on the product label of the device. All labels shall be at least 2 mm (5⁄64 in.) high. The detachable components shall be listed following the statement by type, identification, and how properly used.

"TO BE COMPLIANT WITH NFPA 1983, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED IN CONJUNCTION WITH THIS VICTIM EXTRICATION DEVICE:" [The detachable component(s) shall be listed here.]

5.1.8 Litters.

5.1.8.1 Each litter shall have a product label.

5.1.8.2 Each litter shall have a product label stamped, engraved, or otherwise permanently marked with the portions of the product label information specified in 5.1.8.2.1 through 5.1.8.2.2.

5.1.8.2.1 Each litter shall have the following compliance statement:

"MEETS NFPA 1983 (2012 ED)"

5.1.8.2.2 Each litter shall display the mark or logo of the certification organization and the manufacturer's name or identifying mark.

5.1.8.3 The product label for the portions of the product label information not specified in 5.1.8.2.1 and 5.1.8.2.2 shall be permitted to be a hang tag affixed to each individual litter.

5.1.8.4 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.8.5 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.8.6 All worded portions of the required product label shall be at least in English.

5.1.8.7 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.8.8 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.8.9 Each litter shall have the following compliance statement on the product label:

"MEETS THE LITTER REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.8.10 In addition to the compliance statement specified in 5.1.8.9, litters shall include the following additional information on the product label:

"VERTICAL BREAKING STRENGTH: _____kN.
HORIZONTAL BREAKING STRENGTH: _____kN"

5.1.8.11 In addition to the compliance and information statements in 5.1.8.9 and 5.1.8.11, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.9 Escape Webbing.

5.1.9.1 Escape webbing shall meet the labeling requirements in 5.1.2, excluding 5.1.2.8, 5.1.2.9, 5.1.2.10, 5.1.2.11, and 5.1.2.12.

5.1.9.2 Each escape webbing shall have the following compliance statement on the product label:

"THIS WEBBING MEETS THE ESCAPE WEBBING REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.9.3* In addition to the compliance statement specified in 5.1.9.3, at least the following information shall be provided on the product label:

"MINIMUM BREAKING STRENGTH: _____ kN
PERIMETER: _____ mm
Type of fiber(s) _____"

5.1.9.4 The perimeter of the escape webbing, which is required in 5.1.9.3 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.9.2.

5.1.9.5 In addition to the compliance statement specified in 5.1.9.3, each escape webbing shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.).

"MEETS REQUIREMENTS FOR ESCAPE WEBBING OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.10 Fire Escape Webbing.

5.1.10.1 Fire escape webbing shall meet the labeling requirements in 5.1.2, escape rope, excluding 5.1.2.8, 5.1.2.9, 5.1.2.10, 5.1.2.11, and 5.1.2.12.

5.1.10.2 Each fire escape webbing shall have the following compliance statement on the product label:

"THIS WEBBING MEETS THE FIRE ESCAPE WEBBING REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.10.3* In addition to the compliance statement specified in 5.1.10.2, at least the following information shall be provided on the product label:

"MINIMUM BREAKING STRENGTH: _____ kN
PERIMETER: _____ mm
Type of fiber(s) _____"

5.1.10.4 The perimeter of the fire escape webbing, which is required in 5.1.10.3 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.10.2.

5.1.10.5 In addition to the compliance statement specified in 5.1.10.2, each fire escape webbing shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.).

"MEETS REQUIREMENTS FOR FIRE ESCAPE WEBBING OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.11 Escape Systems Compliance and Information Statements.

5.1.11.1 Each escape system shall have a product label.

5.1.11.2 Each escape system load-bearing hardware item shall have a product label stamped, engraved, or otherwise permanently marked with the portions of the product label information specified in 5.1.5.2.1 through 5.1.5.2.5.

5.1.11.2.1 Each load-bearing escape system component shall have the following compliance statement:

"MEETS NFPA 1983 (2012 ED)"

5.1.11.2.2 Each load-bearing hardware escape system component shall display the mark or logo of the certification organization and the manufacturer's name or identifying mark.

5.1.11.2.3 Each load-bearing hardware escape system component shall display at least the minimum rated breaking strength prefaced by the letters "MBS." The minimum breaking strength value stated on the product label shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing, but shall not be greater than the calculated minimum breaking strength.

5.1.11.2.4 Each load-bearing escape system component shall display an "E" for escape use items. The designation "E" shall be designated in accordance with 6.5.2.1.

5.1.11.2.5 Each system device, rope grab device, and descent control device shall also display the range of rope diameters with which the device is intended to be used.

5.1.11.3 The product label for the portions of the product label information not specified in 5.1.5.2.1 shall be permitted to be a hang tag affixed to each individual equipment item or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the escape system.

5.1.11.4 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.11.5 Multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.

5.1.11.6 All worded portions of the required product label shall be at least in English.

5.1.11.7 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.11.8 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.11.9 Each escape system shall have the following compliance statement on the product label:

For fire escape systems: "THIS [insert name of equipment item here] MEETS THE FIRE ESCAPE SYSTEM REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

For escape systems: "THIS [insert name of equipment item here] MEETS THE ESCAPE SYSTEM REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.11.10 In addition to the compliance and information statements in 5.1.5.9, 5.1.5.10, and 5.1.5.11, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.11.11 Where detachable components must be used with the escape system item in order for the escape system to be compliant with this standard, at least the following statement and information shall also be printed legibly on the product label of the item. All letters shall be at least 2.5 mm (3⁄32 in.) high. The detachable component(s) shall be listed following the statement by type, identification, and how properly used.

"TO BE COMPLIANT WITH NFPA 1983, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED IN CONJUNCTION WITH THIS [insert type of escape system here]:"
[The detachable component(s) shall be listed here.]

5.1.12 Fire Escape Rope.

5.1.12.1* Each fire escape rope item shall have a product label.

5.1.12.2* Where fire escape rope is an integral and nonseparable piece of a manufactured system and that manufactured system is certified as compliant with this standard, the fire escape rope shall be required to have at least the continuous identification tape specified in 5.1.2.12.

5.1.12.3 The fire escape rope product label shall be permitted to be a hang tag affixed to each fire escape rope or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the fire escape rope.

5.1.12.4 All letters shall be at least 1.6 mm (1⁄16 in.) high.

5.1.12.5 All worded portions of the required product label shall be at least in English.

5.1.12.6 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.12.7 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.12.8 Each fire escape rope shall have the following compliance statement on the product label:

"THIS ROPE MEETS THE FIRE ESCAPE ROPE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.12.9* In addition to the compliance statement specified in 5.1.12.8, at least the following information shall be provided on the product label:

"MINIMUM BREAKING STRENGTH: _____ kN
DIAMETER: _____ mm
Type of fiber(s) _____"

5.1.12.10 The minimum breaking strength value of the fire escape rope, which is required in 5.1.12.9 to be stated on the product label, shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing in accordance with 7.2.1, but shall not be greater than the calculated minimum breaking strength.

5.1.12.11 The diameter of the fire escape rope, which is required in 5.1.12.9 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.2.2.

5.1.12.12* In addition to the compliance statement specified in 5.1.12.9, each fire escape rope shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.):

"MEETS REQUIREMENTS FOR FIRE ESCAPE ROPE OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.12.13 In addition to the compliance and information statements in 5.1.12.8, 5.1.12.9, and 5.1.12.12, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number
(6) Elongation at 1.35 kN (300 lb)
(7) Elongation at 2.7 kN (600 lb)
(8) Elongation at 4.4 kN (1000 lb)

5.1.13 Manufacturer-Supplied Eye Termination.

5.1.13.1 Each manufacturer-supplied eye termination shall have a product label.

5.1.13.2 The manufacturer-supplied eye termination product label shall be permitted to be a hang tag affixed to each manufacturer-supplied eye termination or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the manufacturer-supplied eye termination.

5.1.13.3 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.13.4 All worded portions of the required product label shall be at least in English.

5.1.13.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.13.6 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.13.7 Each manufacturer-supplied eye termination shall have the following compliance statement on the product label:

"THIS MANUFACTURER-SUPPLIED EYE TERMINATION MEETS THE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION
MBS: _____kN"

5.1.13.8 In addition to the compliance statement specified in 5.1.13.7, at least the following information shall be provided on the product label:

"THIS (ROPE OR ESCAPE WEBBING) IS CERTIFIED AS CLASS: _____ (ROPE OR WEBBING) WITH MBS OF ___kN
DIAMETER: _____mm
Type of Fibers: _____,
Thread Fiber: _____"

5.1.13.9 In addition to the compliance and information statements in 5.1.13.7 and 5.1.13.8, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacturer
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number

5.1.13.10 Where the manufacturer of the rope and the manufacturer of the manufacturer supplied eye termination are the same, the labeling for both the rope and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required product label information of the rope and of the manufacturer-supplied eye termination as given in 5.1.13.1 through 5.1.13.9 is included on the label.

5.1.13.11 Where the manufacturer of the manufactured system and the manufacturer of the manufacturer-supplied eye termination are the same, the labeling for both the system and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required product label information of the manufactured system and of the manufacturer-supplied eye termination as given in 5.1.13.1 through 5.1.13.9 is included on the label. Where the manufacturer of the escape webbing and the manufacturer of the manufacturer-supplied eye termination are the same, the labeling for both the escape webbing and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required product label information of the escape webbing and of the manufacturer-supplied eye termination as given in 5.1.13 through 5.1.13.9 is included on label.

5.1.13.12 Where the manufacturer of the escape webbing and the manufacturer of the manufacturer-supplied eye termination are the same, the labeling for both the escape webbing and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required product label information of the escape webbing and of the manufacturer-supplied eye termination as given in 5.1.12.1 through 5.1.12.8 is included on label.

5.1.14 Moderate Elongation Laid Life Saving Rope.

5.1.14.1 Each moderate elongation laid life saving rope shall have a product label.

5.1.14.2 The moderate elongation laid life saving rope product label shall be permitted to be a hang tag affixed to each rope or shall be permitted to be printed on a sheet that is inserted and sealed in the packaging that immediately contains the moderate elongation laid life saving rope.

5.1.14.3 All letters shall be at least 2 mm (5⁄64 in.) high.

5.1.14.4 All worded portions of the required product label shall be at least in English.

5.1.14.5 Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).

5.1.14.6 The certification organization's label, symbol, or identifying mark shall be legibly printed on the product label. All letters shall be at least 2.5 mm (3⁄32 in.) high.

5.1.14.7 Each moderate elongation laid life saving rope shall have the following compliance statement on the product label:

"THIS ROPE MEETS THE MODERATE ELONGATION LAID LIFE SAVING ROPE REQUIREMENTS OF NFPA 1983, *STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES*, 2012 EDITION."

5.1.14.8 In addition to the compliance statement specified in 5.1.14.7, at least the following information shall be provided on the product label:

"MINIMUM BREAKING STRENGTH: ___kN
DIAMETER: ____mm
Type of Fiber(s) :_____:"

5.1.14.9 The minimum breaking strength value of the moderate elongation laid life saving rope, which is required in 5.1.14.8 to be stated on the product label, shall be permitted to be any value greater than the actual "pass" requirement value determined by the certification testing in accordance with 7.14.1, but shall not be greater than the calculated minimum breaking strength.

5.1.14.10 The diameter of the moderate elongation laid life saving rope, which is required in 5.1.14.8 to be stated on the product label, shall be as determined by the certification organization in accordance with 7.14.2.

5.1.14.11 In addition to the compliance statement specified in 5.1.14.7, each moderate elongation laid life saving rope shall also be marked for its full length by insertion of a continuous identification tape(s). At least the following statement and information shall be legibly printed on the tape not less than every 1 m (39 in.):

"MEETS REQUIREMENTS FOR MODERATE ELONGATION LAID LIFE SAVING ROPE OF NFPA 1983"
[Certification organization's label, symbol, or identifying mark]
[Name of manufacturer]
[Year and quarter of manufacture (not coded)]

5.1.14.12 In addition to the compliance and information statements specified in 5.1.14.7, 5.1.14.8, and 5.1.14.11, at least the following information shall also be printed legibly on the product label(s). All letters shall be at least 2 mm (5⁄64 in.) high.

(1) Manufacturer's name, identification, or designation
(2) Manufacturer's address
(3) Country of manufacture
(4) Manufacturer's product identification
(5) Model, style, lot, or serial number
(6) Elongation at 1.35 kN (300 lbf)
(7) Elongation at 2.7 kN (600 lbf)
(8) Elongation at 4.4 kN (1000 lbf)

5.2 User Information.

5.2.1 Life Safety Rope User Information.

5.2.1.1 The manufacturer of life safety rope that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.1.2 The manufacturer shall provide information for the user to consider prior to reusing life safety rope, including that the rope be considered for reuse only if all of the following conditions are met:

(1) Rope has not been visually damaged.
(2) Rope has not been exposed to heat, direct flame impingement, or abrasion.
(3) Rope has not been subjected to any impact load.
(4) Rope has not been exposed to liquids, solids, gases, mists, or vapors of any chemical or other material that can deteriorate rope.
(5) Rope passes inspection when inspected by a qualified person following the manufacturer's inspection procedures both before and after each use.

5.2.1.3 The manufacturer shall provide information for the user regarding not using the life safety rope and removing the rope from service if the rope does not meet all of the conditions in 5.2.1.2, if the rope does not pass inspection, or if there is any doubt about the safety or serviceability of the rope.

5.2.1.4 The manufacturer shall provide information for the user regarding at least the following issues:

(1)*Inspecting the rope periodically according to the manufacturer's inspection procedure
(2) Removing the rope from service and destroying it if the rope does not pass inspection or if there is any doubt about the safety or serviceability of the rope
(3) Protecting the rope from abrasion
(4) Not exposing the rope to flame or high temperature and carrying the rope where it will be protected as the rope could melt or burn and fail if exposed to flame or high temperature
(5) Keeping the product label and user instructions/information after they are removed/separated from the rope and retaining them in the permanent rope record; copying the product label and user instructions/information and keeping the copies with the rope
(6) Referring to the user instructions/information before and after each use
(7) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences

5.2.1.5 The manufacturer shall provide information for the user that additional information regarding moderate elongation laid life saving rope can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.1.6 The manufacturer of life safety rope that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of life safety rope and a list of items that the records need to contain.

5.2.2 Escape Rope, Escape Webbing, Fire Escape Rope, and Fire Escape Webbing User Information.

5.2.2.1 The manufacturer of escape rope, escape webbing, fire escape rope, and fire escape webbing that are certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.2.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Using the rope only with a life safety harness or escape belt
(2) Inspecting the rope periodically according to the manufacturers' inspection procedure
(3) Removing the rope from service and destroying it if the rope does not pass inspection or if there is any doubt about the safety or serviceability of the rope
(4) Protecting the rope from abrasion
(5) Not exposing the rope to flame or high temperature and carrying the rope where it will be protected as the rope could melt or burn and fail if exposed to flame or high temperature
(6) Keeping the product label and user instructions/information after they are removed/separated from the rope for future reference
(7) Referring to the user instructions/information before and after each use
(8) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences

5.2.2.3 The manufacturer shall provide information for the user that additional information regarding escape rope, escape webbing, fire escape rope, and fire escape webbing can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.2.4 The manufacturer of escape rope, escape webbing, fire escape rope, and fire escape webbing that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained

by the purchaser or user of escape rope, escape webbing, fire escape rope, and fire escape webbing and a list of items that the records need to contain.

5.2.3 Life Safety Harness User Information.

5.2.3.1 The manufacturer of life safety harnesses that are certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.3.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the harness periodically according to the manufacturer's inspection procedure.
(2) Removing the harness from service and destroying it if the harness does not pass inspection or if there is any doubt about the safety or serviceability of the harness.
(3) For a life safety harness certified to only the nonoptional requirements of the standard, not exposing the harness to flame or high temperature and carrying the harness where it will be protected, as the harness could melt or burn and fail if exposed to flame or high temperature.
(4) Repairing the harness only in accordance with the manufacturer's instructions.
(5) Keeping the user instructions/information after they are separated from the harness and retaining them in a permanent record; copying the user instructions/information and keeping the copy with the harness.
(6) Referring to the user instructions/information before and after each use.
(7) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences.

5.2.3.3 The manufacturer shall provide information for the user that additional information regarding life safety harnesses can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.3.4 The manufacturer of life safety harnesses that are certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of life safety harnesses and a list of items that the records need to contain.

5.2.3.5 The manufacturer of life safety harnesses that are certified as being compliant with this standard shall indicate that tie-off is required for webbing ends if tie-off of webbing end(s) was required during testing. The instructions shall include location(s) and method(s) with text and/or illustrations.

5.2.4 Belt User Information.

5.2.4.1 The manufacturer of belts that are certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.4.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the belt periodically according to the manufacturer's inspection procedure.
(2) Removing the belt from service and destroying it if the belt does not pass inspection or if there is any doubt about the safety or serviceability of the belt.
(3) For belts certified to only the nonoptional requirements of the standard, not exposing the belt to flame or high temperature and carrying the belt where it will be protected, as the belt could melt or burn and fail if exposed to flame or high temperature.
(4) Repairing the belt only in accordance with the manufacturer's instructions.
(5) Keeping the user instructions/information after they are separated from the belt and retaining them in a permanent record; copying the user instructions/information and keeping the copy with the belt
(6) Referring to the user instructions/information before and after each use.
(7) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences.

5.2.4.3 The manufacturer shall provide information for the user that additional information regarding belts can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.4.4 The manufacturer of belts that are certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of belts and a list of items that the records need to contain.

5.2.4.5 The manufacturer of belts that are certified as being compliant with this standard shall indicate that tie-off of webbing end(s) is required for webbing end(s) if tie-off of webbing end(s) was required during testing. The instructions shall include location(s) and method(s) with text and/or illustrations.

5.2.5 Auxiliary Equipment User Information.

5.2.5.1 The manufacturer of auxiliary equipment that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.5.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the auxiliary equipment periodically according to the manufacturer's inspection procedure.
(2) Removing the auxiliary equipment from service if the equipment does not pass inspection or if there is any doubt about the safety or serviceability of the equipment.
(3) Maintaining the auxiliary equipment in accordance with the manufacturer's instructions where metal components are subjected to corrosion or deterioration.
(4) Returning auxiliary equipment to the manufacturer or to a qualified inspection person/center if the equipment is dropped or impact-loaded.
(5) Not exposing the software auxiliary equipment to flame or high temperature and carrying the equipment where it will be protected as it could melt or burn and fail if exposed to flame or high temperature.
(6) Repairing the auxiliary equipment only in accordance with the manufacturer's instructions.
(7) Keeping the user instructions/information after they are separated from the auxiliary equipment and retaining them in a permanent record; copying the user instructions/information and keeping the copy with the equipment.
(8) Referring to the user instructions/information before and after each use.
(9) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences.

5.2.5.3 The manufacturer shall provide information for the user that additional information regarding auxiliary equipment

can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.5.4 The manufacturer of auxiliary equipment that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of the auxiliary equipment and a list of items that the records need to contain.

5.2.5.5 In addition to the requirements for auxiliary equipment, the manufacturer of portable anchors shall provide information for the user that indicates the actual configuration of the device when meeting the breaking strength requirement, including the height, attachment points, and angular configuration of the legs, such that the user can set up the equipment in the same configuration as tested.

5.2.5.6 The manufacturer of manufactured systems auxiliary equipment certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of the manufactured system auxiliary equipment.

5.2.5.7* Where auxiliary equipment is tested with a rope, the following statement shall be provided in the user instructions:

"THIS [insert name of equipment item here] HAS PASSED THE MINIMUM BREAKING STRENGTH AND HOLDING LOAD TEST USING THE FOLLOWING ROPE: [insert rope manufacturer name, designation, part number, and diameter here]."

5.2.5.8 Where the auxiliary equipment has been tested with multiple ropes, each rope shall be listed in the user instructions.

5.2.6 Water Rescue Throwline User Information. The manufacturer of a throwline that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.7 Victim Extrication Device User Information.

5.2.7.1 The manufacturer of the victim extrication device that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.7.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the victim extrication device periodically according to the manufacturer's inspection procedure
(2) Removing the victim extrication device from service if the equipment does not pass inspection or if there is any doubt about the safety or serviceability of the equipment
(3) Maintaining the victim extrication device in accordance with the manufacturer's instructions where metal components are subjected to corrosion or deterioration
(4) Returning victim extrication device to the manufacturer or to a qualified inspection person/center if the equipment is dropped or impact-loaded
(5) Not exposing any software component of the victim extrication device to flame or high temperature and carrying the equipment where it will be protected as it could melt or burn and fail if exposed to flame or high temperature
(6) Repairing the victim extrication device only in accordance with the manufacturer's instructions
(7) Keeping the user instructions/information after they are separated from the victim extrication device and retaining them in a permanent record; copying the user instructions/information and keeping the copy with the equipment
(8) Referring to the user instructions/information before and after each use
(9) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences

5.2.7.3 The manufacturer of a victim extrication device that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of the victim extrication device and a list of items that the records need to contain.

5.2.8 Litter User Information.

5.2.8.1 The manufacturer of the litter that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.8.2 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the litter periodically according to the manufacturer's inspection procedure
(2) Removing the litter from service if the equipment does not pass inspection or if there is any doubt about the safety or serviceability of the equipment
(3) Maintaining the litter in accordance with the manufacturer's instructions where metal components are subjected to corrosion or deterioration
(4) Returning litter to the manufacturer or to a qualified inspection person/center if the equipment is dropped or impact-loaded
(5) Not exposing any software component of the litter to flame or high temperature and carrying the equipment where it will be protected as it could melt or burn and fail if exposed to flame or high temperature
(6) Repairing the litter only in accordance with the manufacturer's instructions
(7) Keeping the user instructions/information after they are separated from the litter and retaining them in a permanent record; copying the user instructions/information and keeping the copy with the equipment
(8) Referring to the user instructions/information before and after each use
(9) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences

5.2.8.3 The manufacturer shall provide information for the user that additional information regarding litters can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services*.

5.2.8.4 The manufacturer of a litter that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of the litter and a list of items that the records need to contain.

5.2.9 Manufacturer-Supplied Eye Termination User Information.

5.2.9.1 The manufacturer of the manufacturer-supplied eye termination that is certified as being compliant with the this standard shall furnish the purchaser with at least use criteria,

inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.9.2 The manufacturer shall provide information for the user to consider prior to reusing manufacturer-supplied eye termination, including that the rope be considered for reuse only if all of the following conditions are met:

(1) Manufacturer-supplied eye termination has not been visually damaged.
(2) Manufacturer-supplied eye termination has not been exposed to heat, direct flame impingement, or abrasion.
(3) Manufacturer-supplied eye termination has not been subjected to any impact load.
(4) Manufacturer-supplied eye termination has not been exposed to liquids, solids, gases, mists, or vapors of any chemical or other material that can deteriorate the manufacturer-supplied eye termination.
(5) Manufacturer-supplied eye termination passes inspection when inspected by a qualified person following the manufacturer's inspection procedures both before and after each use.

5.2.9.3 The manufacturer shall provide information for the user regarding not using the manufacturer-supplied eye termination and removing the manufacturer-supplied eye termination from service if the rope does not meet all of the conditions in 5.2.9.2, if the manufacturer-supplied eye termination does not pass inspection, or if there is any doubt about the safety or serviceability of the manufacturer-supplied eye termination.

5.2.9.4 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the manufacturer-supplied eye termination periodically according to the manufacturer's inspection procedure
(2) Removing the manufacturer-supplied eye termination from service and destroying it if the manufacturer-supplied eye termination does not pass inspection or if there is any doubt about the safety of the manufacturer-supplied eye termination
(3) Protecting the manufacturer-supplied eye termination from abrasion
(4) Not exposing the manufacturer-supplied eye termination to flame or high temperature and carrying the manufacturer-supplied eye termination where it will be protected as the manufacturer-supplied eye termination could melt or burn and fail if exposed to flame or high temperature
(5) Keeping the product label and user instructions/information after they are removed/separated from the manufacturer-supplied eye termination and retaining them in the permanent manufacturer-supplied eye termination record; copying the product label and user information/instructions and keeping copies with the manufacturer-supplied eye termination
(6) Referring to the user instructions/information before and after each use
(7) Cautioning that, if the instructions/information are not followed, the user could suffer serious consequences

5.2.9.5 The manufacturer of manufacturer-supplied eye termination that is certified as being compliant with this standard shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of manufacturer-supplied eye termination and a list of items that the records need to contain.

5.2.9.5.1 The suggested inspection records shall include inspection of the loop of the eye, inspection for worn or broken thread in sewn termination, and inspection of contact point of swage and rope in swage termination.

5.2.9.6 Where the manufacturer of the rope and the manufacturer of the manufacturer-supplied eye termination are the same, the user information/instructions for both the rope and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required user information/instructions of the rope and required user information/instructions of manufacturer-supplied eye termination as given in 5.2.9.1 through 5.2.9.5 are included in the user information/instructions.

5.2.9.7 Where the manufacturer of the manufactured system and the manufacturer of the manufacturer-supplied eye termination are the same, the user information/instructions for both the manufactured system and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required user information/instructions of the manufactured system and required user information/instructions of the manufacturer-supplied eye termination as given in 5.2.9.1 through 5.2.9.5 are included in the user information/instructions.

5.2.9.8 Where the manufacturer of the escape webbing and the manufacturer of the manufacturer-supplied eye termination are the same, the user information/instructions for both the escape webbing and the manufacturer-supplied eye termination shall be permitted to be combined, as long as all required user information/instructions of the escape webbing and required user information/instructions of manufacturer-supplied eye termination as given in 5.2.9.1 through 5.2.9.5 are included in the user information/instructions.

5.2.10 Moderate Elongation Laid Life Saving Rope User Information.

5.2.10.1 The manufacturer of moderate elongation laid life saving rope that is certified as being compliant with this standard shall furnish the purchaser with at least use criteria, inspection procedures, maintenance procedures, and retirement criteria for the product.

5.2.10.2 The manufacturer shall provide information for the user to consider prior to reusing moderate elongation laid life saving rope, including that the rope be considered for reuse only if all of the following conditions are met:

(1) Rope has not been visually damaged.
(2) Rope has not been exposed to heat, direct flame impingement, or abrasion.
(3) Rope has not been subjected to any impact load.
(4) Rope has not been exposed to liquids, solids, gases, mists, or vapors of any chemical or other material that can deteriorate rope.
(5) Rope passes inspection when inspected by a qualified person following the manufacturer's inspection procedures both before and after each use.

5.2.10.3 The manufacturer shall provide information for the user regarding not using the moderate elongation laid life saving rope and removing the rope from service if the rope does not meet all of the conditions in 5.2.10.2, if the rope does not pass inspection, or if there is any doubt about the safety or serviceability of the rope.

5.2.10.4 The manufacturer shall provide information for the user regarding at least the following issues:

(1) Inspecting the rope periodically according to the manufacturer's inspection procedure
(2) Removing the rope from service and destroying it if the rope does not pass inspection or if there is any doubt about the safety or serviceability of the rope
(3) Protecting the rope from abrasion
(4) Not exposing the rope to flame or high temperature and carrying the rope where it will be protected as the rope could melt or burn and fail if exposed to flame or high temperature
(5) Keeping the product label and user instructions/information after they are removed/separated from the rope and retaining them in the permanent rope record; copying the product label and user instructions/information and keeping the copies with the rope
(6) Referring to the user instructions/information before and after each use
(7) Cautioning that if the instructions/information are not followed, the user could suffer serious consequences

5.2.10.5 The manufacturer shall provide information for the user that additional information regarding victim extrication devices can be found in NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services.*

Chapter 6 Design and Construction Requirements

6.1 Life Safety Rope.

6.1.1* Life safety rope shall be constructed of virgin fiber.

6.1.2 Life safety rope shall be of block creel construction.

6.1.3 Primary load-bearing elements of life safety rope shall be constructed of continuous filament fiber.

6.1.4 Where life safety rope is a component of equipment with electric-current carrying capabilities, the equipment including the life safety rope shall meet the requirements of ANSI/UL 913, *Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division I, Hazardous (Classified) Locations,* for Class I, Division I, Groups A, B, C, and D and Class II, Division 1, Groups E, F, and G hazardous locations.

6.2 Escape Rope.

6.2.1 Escape rope shall be constructed of virgin fiber.

6.2.2 Escape rope shall be of block creel construction.

6.2.3 Primary load-bearing elements of escape rope shall be constructed of continuous filament fiber.

6.3 Life Safety Harness.

6.3.1 Life safety harness shall be designed and designated in accordance with the requirements for either Class II or Class III.

6.3.1.1 Class II. A harness that fastens around the waist and around thighs or under buttocks and is designed for rescue with a design load of 2.67 kN (600 lbf) shall be designated as a Class II life safety harness.

6.3.1.1.1 Class II life safety harness shall be permitted to consist of one or more parts.

6.3.1.2 Class III.

6.3.1.2.1 A harness that fastens around the waist, around thighs, or under buttocks, and over shoulders and is designed for rescue with a design load of 2.67 kN (600 lbf) shall be designated as Class III life safety harness.

6.3.1.2.2 Class III life safety harness shall be permitted to consist of one or more parts.

6.3.2* Life safety harness shall be permitted to be adjustable within a range of sizes, provided in a range of sizes, or custom-fitted for individuals.

6.3.3* Load-bearing textile materials used in the construction of life safety harness shall be made from virgin, synthetic, continuous filament fiber.

6.3.4* All webbing ends shall be secured by heat sealing or by another method that prevents unraveling.

6.3.5* All thread utilized in the construction of life safety harness shall allow for ease of inspection by the unaided eye with 20/20 vision or vision corrected to 20/20 at a nominal distance of 305 mm (12 in.). All stitching breaks or ends shall be backtacked not less than 13 mm (½ in.).

6.3.6 Life safety harness shall have at least one load-bearing attachment point located at the front waist or sternal location of the harness.

6.3.7 Load-bearing hardware components of life safety harnesses shall be constructed of forged, machined, stamped, extruded, or cast metal.

6.3.7.1 Castings shall meet Class I, Grade A requirements of SAE-STD-2175A, *Castings, Classification and Inspection of.*

6.3.8 Where a buckle is an integral part of a life safety harness, the buckle manufacturer shall provide written evidence that all load-bearing buckles have been proof-loaded to at least 11 kN (2473 lbf).

6.3.9 Optional Requirements for Flame-Resistant Life Safety Harnesses. Sewing thread utilized in the construction of life safety harnesses shall be made of inherently flame-resistant fiber.

6.4 Belts.

6.4.1 Belts shall be designed and designated in accordance with one of the types in 6.4.1.1 or 6.4.1.2.

6.4.1.1 A belt that fastens only around the waist, includes at least one positioning attachment point, and is a positioning device for a person on a ladder shall be designated as a ladder belt.

6.4.1.2 A belt that fastens only around the waist, includes at least one load-bearing attachment point, and is intended for use by the wearer as an emergency self-rescue device shall be designated as an escape belt.

6.4.2* All belts shall be permitted to be adjustable within a range of sizes, provided in a range of sizes, or custom-fitted for individuals.

6.4.3* Load-bearing textile materials used in the construction of all belts shall be made from virgin, synthetic, continuous filament fiber.

6.4.4* All belts shall have webbing ends secured by heat sealing or by another method that prevents unraveling.

6.4.5* All thread utilized in the construction of all belts shall allow for ease of inspection by the unaided eye with 20/20 vision, or vision corrected to 20/20, at a nominal distance of 305 mm (12 in.). All stitching breaks or ends shall be backtacked not less than 13 mm (½ in.).

6.4.6 Ladder belts shall include a tether or device that connects the wearer to a ladder. The tether or device shall not extend greater than 610 mm (24 in.) in total length including connection hardware on each end when measured from the surface of the belt to the inside of the connector device at the greatest distance from the belt.

6.4.7 Load-bearing hardware components of belts shall be constructed of forged, machined, stamped, extruded, or cast metal.

6.4.7.1 Castings shall meet Class I, Grade A requirements of SAE-STD-2175A, *Castings, Classification and Inspection of.*

6.4.8 Where a buckle is an integral part of a belt, the buckle manufacturer shall provide written evidence that all load-bearing buckles have been proof-loaded to at least 11 kN (2473 lbf).

6.4.9 Optional Requirements for Flame-Resistant Belts. Sewing thread utilized in the construction of belts shall be made of inherently flame-resistant fiber.

6.5 Auxiliary Equipment System Component.

6.5.1 Auxiliary equipment shall not be designed or constructed in a manner that allows self-destructive action.

6.5.2 Auxiliary equipment, other than rope grab devices as specified in 6.5.2.2, shall be designated by the manufacturer for its intended use and design load as either escape, technical use, or general use.

6.5.2.1 The designation of escape shall apply to auxiliary equipment intended for the sole use of the rescuer for personal escape or self-rescue.

6.5.2.2 Rope grab devices shall be designated as being designed for either technical use or for general use.

6.5.3 Load-bearing hardware auxiliary equipment shall be constructed of forged, machined, stamped, extruded, or cast metal.

6.5.3.1 Castings shall meet Class I, Grade A requirements of SAE-STD-2175A, *Castings, Classification and Inspection of.*

6.5.4 Where a buckle is an integral part of an auxiliary equipment system component, the buckle manufacturer shall provide written evidence that all load-bearing buckles have been proof-loaded to at least 11 kN (2473 lbf).

6.5.5* Snap-link and carabiner gates shall be self-closing and of a locking design.

6.5.6 Webbing used to construct auxiliary equipment software shall be constructed of virgin, synthetic, continuous filament fiber.

6.5.7* All webbing ends used to construct auxiliary equipment software shall be secured by heat sealing or by another method that prevents unraveling.

6.5.8* All thread utilized to construct auxiliary equipment software shall allow for ease of inspection by the unaided eye with 20/20 vision or vision corrected to 20/20 at a nominal distance of 305 mm (12 in.). All stitching breaks or ends shall be backtacked not less than 13 mm (½ in.).

6.5.9 All descent control devices shall be classified by type in accordance with Section 3.2.1 of ISO 22159, *Personal equipment for protection against falls — descending devices.*

6.6 Throwline.

6.6.1* Throwline shall be constructed of virgin fiber.

6.6.2 Throwline shall be of block creel construction.

6.6.3 Throwline load-bearing elements shall be constructed of continuous filament fiber.

6.7 Victim Extrication Devices.

6.7.1 Victim extrication devices shall be designed and designated in accordance with the requirements for either Class II or Class III.

6.7.1.1 Class II Victim Extrication Device. A device that secures around the waist and around the thighs or under the buttocks to be used for victim extrication in an upright position shall be designated as a Class II victim extrication device.

6.7.1.2 Class III Victim Extrication Device. A device that secures around the waist, around the thighs, or under the buttocks, and over the shoulders or that otherwise encapsulates a body to be used for victim extrication in an upright or horizontal configuration shall be designated as a Class III victim extrication device.

6.7.2 Victim extrication devices shall be permitted to consist of one or more parts.

6.7.3 Load-bearing textile materials used in the construction of victim extrication devices shall be made from virgin, synthetic, continuous filament fiber.

6.7.4 All webbing ends shall be secured by heat sealing or by another method that prevents unraveling.

6.7.5 All thread used in the construction of victim extrication devices shall allow for ease of inspection by the unaided eye with 20/20 vision at nominal distance of 305 mm (12 in.). All stitching breaks or ends shall be backtacked not less than 13 mm (½ in.).

6.7.6 Victim extrication devices shall have at least one load-bearing attachment point as identified by manufacturer's instructions.

6.7.7 Load-bearing hardware components of victim extrication devices shall be constructed of forged, machined, stamped, extruded, or cast metal.

6.7.7.1 Castings shall meet Class I, Grade A requirements of SAE-STD-2175A, *Castings Classifications and Inspection of.*

6.7.8 Where a buckle is an integral part of a victim extrication device, the buckle manufacturer shall provide written evidence that all load-bearing buckles have been proof-loaded to at least 11 kN (2473 lbf).

6.8 Litters.

6.8.1 Litters shall not be designed or constructed in a manner that allows self-destructive action.

6.8.2 Litters designed to split apart shall have an integral connection system.

6.9 Escape Webbing.

6.9.1 Escape webbing shall be constructed of virgin fiber.

6.9.2 Escape webbing shall be of block creel construction.

6.9.3 Primary load-bearing elements of escape webbing shall be constructed of continuous filament fiber.

6.10 Fire Escape Webbing.

6.10.1* Fire escape webbing shall be constructed of virgin fiber.

6.10.2 Fire escape webbing shall be of block creel construction.

6.10.3 Primary load-bearing elements of fire escape webbing shall be constructed of continuous filament fiber.

6.11 Escape System. The escape system shall comprise a flexible lifeline (e.g., rope/webbing/cable); a descent control device and a connector from the system to the user not to include the harness; and a means of attaching the system to an anchoring point (e.g., an escape anchor) that is capable of supporting human loads. The design and construction requirements of the escape system shall meet the requirements of the individual components.

6.12 Fire Escape Rope.

6.12.1* Fire escape rope shall be constructed of virgin fiber.

6.12.2 Fire escape rope shall be of block creel construction.

6.12.3 Primary load-bearing elements of fire escape rope shall be constructed of continuous filament fiber.

6.13 Manufacturer-Supplied Eye Termination.

6.13.1 Manufacturer-supplied eye termination shall include rope or escape webbing that has been tested to and certified to the requirements of rope or escape webbing as specified in this standard.

6.13.2 All thread utilized in the construction of manufacturer-supplied eye termination shall allow for ease of inspection by the unaided eye with 20/20 vision or vision corrected to 20/20 at a nominal distance of 305 mm (12 in.).

6.14 Moderate Elongation Laid Life Saving Rope.

6.14.1* Moderate elongation laid life saving rope shall be constructed of virgin fiber.

6.14.2 Moderate elongation laid life saving rope shall be of block creel construction.

6.14.3 Primary load-bearing elements of moderate elongation laid life saving rope shall be constructed of continuous filament fiber.

6.14.4 Where moderate elongation laid life saving rope is a component of equipment with electric-current carrying capabilities, the equipment including the moderate elongation laid life saving rope shall meet the requirements of ANSI/UL 913, *Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division I, Hazardous (Classified) Locations,* for Class I, Division I, Groups A, B, C, and D and Class II, Division 1, Groups E, F, and G hazardous locations.

Chapter 7 Performance Requirements

7.1* Life Safety Rope Performance Requirements.

7.1.1* Technical use life safety rope shall be tested for breaking strength and elongation as specified in Section 8.2, Rope Breaking and Elongation Test and shall have a minimum breaking strength of not less than 20 kN (4496 lbf), the minimum elongation shall not be less than 1 percent at 10 percent of breaking strength; and the maximum elongation shall not be more than 10 percent at 10 percent of breaking strength.

7.1.2* General use life safety rope shall be tested for breaking strength and elongation as specified in Section 8.2, Rope Breaking and Elongation Test and shall have a minimum breaking strength of not less than 40 kN (8992 lbf); the minimum elongation shall not be less than 1 percent at 10 percent of breaking strength; and the maximum elongation shall not be more than 10 percent at 10 percent of breaking strength.

7.1.3* Technical use life safety rope shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope,* and shall have a diameter of 9.5 mm (⅜ in.) or greater but less than 12.5 mm (½ in.). For the purpose of reporting, the calculated diameter of all new life safety rope shall be rounded to the nearest 0.5 mm (1/64 in.).

7.1.4* General use life safety rope shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope,* and shall have a diameter of 11 mm (7/16 in.) or greater but less than or equal to 16 mm (⅝ in.). For the purpose of reporting, the calculated diameter of all new life safety rope shall be rounded to the nearest 0.5 mm (1/64 in.).

7.1.5* Fiber utilized for all life safety rope shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis,* and shall have a melting point of not less than 204°C (400°F).

7.1.6 Life safety rope product labels and identification tape shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, shall remain in place, and shall not be torn or otherwise damaged.

7.2* Escape Rope Performance Requirements.

7.2.1* Escape rope shall be tested for breaking strength and elongation as specified in Section 8.2, Rope Breaking and Elongation Test, and shall have a minimum breaking strength of not less than 13.5 kN (3034 lbf), the minimum elongation shall not be less than 1 percent at 10 percent of breaking strength, and the maximum elongation shall not be more than 10 percent at 10 percent of breaking strength.

7.2.2* Escape rope shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope,* and shall have a diameter of 7.5 mm (19/64 in.) or greater, but less than 9.5 mm (⅜ in.). For the purpose of reporting, the calculated diameter of all new escape rope shall be rounded to the nearest 0.5 mm (1/64 in.).

7.2.3* Fiber utilized for all escape rope shall be tested for melting in accordance with ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis,* and shall have a melting point of not less than 204°C (400°F).

7.2.4 Escape rope product labels and identification tape shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, shall remain in place, and shall not be torn or otherwise damaged.

7.3 Throwline Performance Requirements.

7.3.1 Throwline shall be tested for minimum breaking strength as specified in Section 8.2, Rope Breaking and Elongation Test, and shall have a minimum breaking strength of not less than 13 kN (2923 lbf).

7.3.2* Throwline shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope*, and shall have a diameter of 7 mm (19⁄64 in.) or greater, but less than 9.5 mm (3⁄8 in.). For the purpose of reporting, the calculated diameter of all new life safety rope shall be rounded to the nearest 0.5 mm (1⁄64 in.).

7.3.3 Throwline shall be tested for the ability to float as specified in Section 8.9, Floatability Test, and shall float.

7.3.4 Throwline product labels and identification tape shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall remain in place and shall be legible.

7.4 Life Safety Harness Performance Requirements.

7.4.1 Class II Life Safety Harness.

7.4.1.1 Class II life safety harness shall be tested for strength as specified in Section 8.3, Static Test, and shall not release from the test torso, the harness buckles and adjusting devices shall not slip more than 25 mm (1 in.), and the harness shall show no visible signs of damage that would affect its function.

7.4.1.2 Class II life safety harness shall be tested for drop as specified in Section 8.4, Drop Test, and the test torso shall not contact the ground during any of the test drops.

7.4.1.3 Where Class II life safety harness include side D-rings and attachment points designated by the manufacturer as positioning attachments only, these attachments shall be tested for strength as specified in Section 8.3, Static Test, and shall show no visible signs of damage that would affect its function.

7.4.2 Class III Life Safety Harness.

7.4.2.1 Class III life safety harness shall be tested for strength as specified in Section 8.3, Static Test, and shall not release from the test torso; the harness buckles and adjusting devices shall not slip more than 25 mm (1 in.); and the harness shall show no visible signs of damage that would affect its function.

7.4.2.2 Class III life safety harness shall be tested for drop as specified in Section 8.4, Drop Test, and the test torso shall not contact the ground during any of the test drops.

7.4.2.3 Where Class III life safety harness include side D-rings and attachment points designated by the manufacturer as positioning attachments only, these attachments shall be tested for strength as specified in Section 8.3, Static Test, and shall show no visible signs of damage that would affect its function.

7.4.3 All life safety harness product labels shall be tested for durability as specified in Section 8.10, Product Label Durability Test, and shall be legible, and shall not be torn or otherwise damaged.

7.4.4 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturers' operating instructions.

7.4.5* All fiber and thread used in load-bearing materials and thread used in the construction of Class II and Class III life safety harness shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.4.6 Optional Requirements for Flame-Resistant Life Safety Harnesses.

7.4.6.1 Where harnesses are represented as being flame-resistant, materials and hardware shall be tested individually for flame resistance as specified in Section 8.16, Flame Resistance Test, and shall have an average char length of not more than 100 mm (4 in.), shall have an average afterflame of not more than 2.0 seconds, and shall not melt or drip.

7.4.6.2 Where harnesses are represented as being flame-resistant, materials, labels, and hardware shall be tested individually for heat resistance as specified in Section 8.16, Heat Resistance Test, and shall not melt, drip, separate, or ignite; hardware items shall remain functional.

7.4.6.3 Where harnesses are represented as being flame-resistant, sewing thread utilized in the construction of harnesses shall be tested for heat resistance as specified in Section 8.18, Thread Heat Resistance Test, and shall not melt.

7.5 Belt Performance Requirements.

7.5.1 Ladder belts shall be tested for strength as specified in Section 8.3, Static Test, and shall not release from the test torso, shall not slip more than 25 mm (1 in.), and shall show no visible signs of damage that would affect their function.

7.5.1.1 Where ladder belts include side D-rings and attachment points designated by the manufacturer as positioning attachments only, these attachments shall be tested for strength as specified in Section 8.3, Static Test, and shall show no visible signs of damage that would affect their function.

7.5.2 Escape belts shall be tested for strength as specified in Section 8.3, Static Test, and shall not release from the test torso, shall not slip more than 25 mm (1 in.), and shall show no visible signs of damage that would affect their function.

7.5.2.1 Where escape belts include side D-rings and attachment points designated by the manufacturer as positioning attachments only, these attachments shall be tested for strength as specified in Section 8.3, Static Test, and shall show no visible signs of damage that would affect their function.

7.5.3 Escape belts shall be tested for drop as specified in Section 8.4, Drop Test, and the test torso shall not contact the ground during any of the test drops.

7.5.4 All belt product labels shall be tested for durability as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.5.5 Metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.5.6 Optional Requirements for Flame-Resistant Belts.

7.5.6.1 Where belts are represented as being flame-resistant, materials and hardware shall be tested individually for flame resistance as specified in Section 8.16, Flame Resistance Test, and shall have an average char length of not more than 100 mm

(4 in.), shall have an average afterflame of not more than 2.0 seconds, and shall not melt or drip.

7.5.6.2 Where belts are represented as being flame-resistant, materials, labels, and hardware shall be tested individually for heat resistance as specified in Section 8.17, Heat Resistance Test, and shall not melt, drip, separate, or ignite; and hardware items shall not ignite and shall remain functional.

7.5.6.3 Where belts are represented as being flame-resistant, sewing thread utilized in the construction of harnesses shall be tested for heat resistance as specified in Section 8.18, Thread Heat Resistance Test, and shall not melt.

7.5.7 Manufactured Systems Performance Requirements.

7.5.7.1 Technical use manufactured systems shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and shall have no permanent damage to the system or its component parts or visible deformation to the general shape of the system or components.

7.5.7.2 Technical use manufactured systems shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 22 kN (4946 lbf) without failure.

7.5.7.3 General use manufactured systems shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and shall have no permanent damage to the system or its component parts or visible deformation to the general shape of the system or components.

7.5.7.4 General use manufactured systems shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 36 kN (8093 lbf) without failure.

7.5.7.5 Permanently attached manufactured system product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, shall remain in place, and shall not be torn or otherwise damaged.

7.5.7.6 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturers' operating instructions.

7.5.7.7 Where a manufactured system contains a life safety harness subcomponent, the life safety harness shall be individually tested, labeled, and certified to meet the appropriate requirements specified in Section 7.3, Throwline Performance Requirements, and 7.4, Life Safety Harness Performance Requirements, in addition to the manufactured system requirements of 7.5.7.1 through 7.5.7.6as applicable.

7.5.7.8 Where a manufactured system contains a belt subcomponent, the belt shall be individually tested, labeled, and certified to meet the appropriate requirements specified in Section 7.5, Belt Performance Requirements, in addition to the manufactured system requirements of 7.5.7.1 through 7.5.7.6 as applicable.

7.5.7.9 Where a manufactured system contains an ascending device, rope grab device, or descent control device, the system shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall not show any permanent damage or visible deformation to the general shape of the device and shall not show any damage to the rope.

7.5.7.10 Where the manufactured system incorporates an escape descent control device that incorporates a passive or active breaking feature that creates friction between the device and the rope, the system shall be tested for maximum payout force as specified in Section 8.13, Payout Test, shall not release the test torso, and shall not exceed 90 N (20 lb).

7.5.7.11 All fiber and thread used in load-bearing materials and thread used in the construction of manufactured systems shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.5.8 End-to-End and Multiple Configuration Strap Performance Requirements.

7.5.8.1 Technical use multiple configuration straps shall be tested for breaking strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum breaking strength of at least 32 kN (7194 lbf) without failure.

7.5.8.1.1 Where the strap includes an adjustment device, the adjustment device shall not slip more than 50 mm (2 in.).

7.5.8.2 General use multiple configuration straps shall be tested for breaking strength as specified in Section 8.7, Breaking Strength Test, and shall have a minimum breaking strength of at least 45 kN (10,120 lbf) without failure.

7.5.8.2.1 Where the strap includes an adjustment device the adjustment device shall not slip more than 50 mm (2 in.).

7.5.8.3 Technical use end-to-end straps shall be tested for breaking strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum breaking strength of at least 20 kN (4500 lbf) without failure.

7.5.8.3.1 Where the strap includes an adjustment device, the adjustment device shall not slip more than 50 mm (2 in.).

7.5.8.4 General use end-to-end straps shall be tested for breaking strength as specified Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum breaking strength of at least 27 kN (6070 lbf) without failure.

7.5.8.4.1 Where the strap includes an adjustment device, the adjustment device shall not slip more than 50 mm (2 in.).

7.5.8.5 Permanently attached end-to-end and multiple configuration strap product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.5.8.6 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.5.8.7* All fiber and thread used for end-to-end and multiple configuration straps shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization*

Temperatures by Thermal Analysis, and shall have a melting point of not less than 204°C (400°F).

7.5.9 Other Auxiliary Equipment Performance Requirements.

7.5.9.1 Other technical use auxiliary equipment shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 22 kN (4946 lbf) without failure.

7.5.9.2 Other general use auxiliary equipment shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 36 kN (8093 lbf)

7.5.9.3 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.5.9.4* All fiber and thread utilized in the construction of all auxiliary equipment systems and system components shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.5.9.5 All auxiliary equipment systems and system component product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.5.10* All fiber and thread used in the construction of all belts shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.5.11 All fiber and thread used in load-bearing materials and thread used in the construction of belts shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.6 Auxiliary Equipment Performance Requirements.

7.6.1 Carabiners and Snap-Link Performance Requirements.

7.6.1.1 Technical use carabiners and snap-links shall be tested for strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall, with the gate closed, have a major axis minimum breaking strength of at least 27 kN (6069 lbf).

7.6.1.2 Technical use carabiners and snap-links shall be tested for strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall, with the gate open, have a major axis minimum breaking strength of at least 7 kN (1574 lbf).

7.6.1.3 Technical use carabiners and snap-links shall be tested for strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall have a minor axis minimum breaking strength of at least 7 kN (1574 lbf).

7.6.1.4 General use carabiners and snap-links shall be tested for breaking strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall, with the gate closed, have a major axis minimum breaking strength of at least 40 kN (8992 lbf).

7.6.1.5 General use carabiners and snap-links shall be tested for breaking strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall, with the gate open, have a major axis minimum breaking strength of at least 11 kN (2473 lbf).

7.6.1.6 General use carabiners and snap-links shall be tested for breaking strength as specified in Section 8.5, Carabiner and Snap-Link Tensile Test, and shall have a minor axis minimum breaking strength of at least 11 kN (2473 lbf).

7.6.1.7 Permanently attached carabiner and snap-link product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, and shall not be torn or otherwise damaged.

7.6.1.8 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturers' operating instructions.

7.6.2 Rope Grab and Ascending Devices Performance Requirements.

7.6.2.1 Technical use rope grab and ascending devices shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall show no permanent damage to the device or damage to the rope.

7.6.2.2 General use rope grab and ascending devices shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall show no permanent damage to the device or damage to the rope.

7.6.2.3 Permanently attached rope grab and ascending device product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, and shall not be torn or otherwise damaged.

7.6.2.4 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.6.3 Descent Control Device Performance Requirements.

7.6.3.1 Escape descent control devices shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall show no permanent damage or visible deformation to the general shape of the device or damage to the rope.

7.6.3.2 Escape descent control devices shall be tested for breaking strength as specified in Section 8.6, Manner of Function Tensile Test, Procedure B, and shall have a minimum breaking strength of at least 13.5 kN (3034 lbf).

7.6.3.3 Technical use descent control devices shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall show no permanent damage or visible deformation to the general shape of the device or damage to the rope.

7.6.3.4 General use descent control devices shall be tested for deformation as specified in Section 8.6, Manner of Function Tensile Test, Procedure A, and shall show no permanent damage or visible deformation to the general shape of the device or damage to the rope.

7.6.3.5 General use descent control devices shall be tested for breaking strength as specified in Section 8.6, Manner of Function Tensile Test, Procedure B, and shall have a minimum breaking strength of at least 22 kN (4946 lbf).

7.6.3.5.1 Where the descent control device is designed to slip under high load, general use descent control devices shall be tested for slippage as specified in Section 8.6, Manner of Function Tensile Test, Procedure B, and shall not slip under a test load of 9 kN (2023 lbf).

7.6.3.6 ISO 22159, *Personal equipment for protection against falls — Descending devices*, Type 2, 3, and 4 descent control devices with a hands-free locking element shall be tested in accordance with Section 8.11, Holding Test, and shall meet the requirements in 4.6.1 of ISO 22159.

7.6.3.6.1 ISO 22159 Type 2 and 3 descent control devices with a panic-locking element shall be tested in accordance with Section 8.11, Holding Test, and shall meet the requirements in 4.6.2 of ISO 22159.

7.6.3.6.2 ISO 22159 Type 5 and 6 descent control devices shall be tested in accordance with Section 8.11, Holding Test, and shall meet the requirements in 4.6.3 of ISO 22159.

7.6.3.7 Permanently attached descent control device product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, and shall not be torn or otherwise damaged.

7.6.3.8 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.6.3.9 Where the escape descent control device incorporates a passive or active breaking feature that creates friction between the device and the rope, the maximum force required to pay a specific type of rope through the descent control device shall be tested as specified in Section 8.13, Payout Test, and shall not exceed 90 N (20 lb).

7.6.3.10 System Level Drop Test. Escape systems shall be tested for maximum impact force as specified in Section 8.14, Escape Descent Control Device and Systems Drop Test, and shall have the maximum impact force not exceed 8.0 kN (1798.5 lbf), shall not damage the rope or device, and shall remain functional.

7.6.4 Portable Anchor Performance Requirements.

7.6.4.1 Technical use portable anchor devices shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and all adjustments or moving parts shall remain functional, and shall exhibit no condition that would cause the safety of the user to be compromised.

7.6.4.2 General use portable anchor devices shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and all adjustments or moving parts shall remain functional, and shall exhibit no condition that would cause the safety of the user to be compromised.

7.6.4.3 Technical use portable anchor devices shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall withstand a minimum load of at least 22 kN (4946 lbf) without failure.

7.6.4.4 General use portable anchor devices shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall withstand a minimum load of at least 36 kN (8093 lbf) without failure.

7.6.4.5 Permanently attached portable anchor product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.6.4.6 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.6.5 Pulley Performance Requirements.

7.6.5.1 Technical use pulleys shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and shall show no permanent damage to the device or damage to the rope.

7.6.5.2 Technical use pulleys shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 22 kN (4946 lbf) without failure.

7.6.5.3 General use pulleys shall be tested for deformation as specified in Section 8.7, Breaking Strength Test, Procedure A, and shall show no permanent damage to the device or damage to the rope.

7.6.5.4 General use pulleys shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 36 kN (8093 lbf) without failure.

7.6.5.5 The becket on technical use pulleys shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 12 kN (2698 lbf) without failure.

7.6.5.6 The becket on general use pulleys shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 19.5 kN (4383 lbf) without failure.

7.6.5.7 Permanently attached pulley product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, and shall not be torn or otherwise damaged.

7.6.5.8 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.7 Victim Extrication Device Performance Requirements.

7.7.1 Class II Victim Extrication Devices.

7.7.1.1 Class II victim extrication devices shall be tested for strength as specified in Section 8.3, Static Test, and shall not release the test torso. The device buckles and adjusting devices shall not slip more than 25 mm (1 in.), and the device shall show no visible signs of damage that would affect its function.

7.7.1.2 Where Class II victim extrication devices include alternate D-rings and attachment points designated by the manufacture's as alternate lifting points or configurations, these attachments shall be tested for strength as specified as in Section 8.3, Static Test, and shall show no visual signs of damage that would affect its function.

7.7.2 Class III Victim Extrication Device.

7.7.2.1 Class III Victim extrication devices shall be tested for strength as specified in Section 8.3, Static Test, and shall not release the test torso. The device buckles and adjusting devices shall not slip more than 25 mm (1 in.), and the device shall show no visible signs of damage that would affect its function.

7.7.2.2 Where Class III victim extrication devices include alternate D-rings and attachment points designated by the manufacture as alternate lifting points or configurations, these attachments shall be tested for strength as specified as in Section 8.3, Static Test, and shall show no visual signs of damage that would affect its function.

7.7.3 All victim extrication device product labels shall be tested for durability as specified in Section 8.10, Product Label Durability Test, and shall be legible and shall not be torn or otherwise damaged.

7.7.4 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.7.5 All fiber used in load-bearing materials and thread used in the construction of Class II and Class III victim extrication devices shall be tested for melting as specified ASTM 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis,* and shall have a melting point of not less than 204°C (400°F).

7.8 Litter Performance Requirements. Litters shall be tested for strength and deformation as specified in Section 8.12, Litter Strength Test, and shall withstand a minimum load of 11 kN (2473 lbf) without failure or deformation of the structural element of more than 50 mm ± 5 mm (2 in. ± 0.2 in.).

7.9 Escape Webbing Performance Requirements.

7.9.1 Escape webbing shall meet the performance requirements specified in Section 7.2, Escape Rope Performance Requirements, excluding 7.2.2.

7.9.2 Escape webbing shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope,* and shall have a minimum perimeter of 25 mm (1 in). For the purpose of reporting, the perimeter of all new escape webbing shall be rounded to the nearest 0.5 mm (1/64 in.).

7.10 Fire Escape Webbing Performance Requirements.

7.10.1 Fire escape webbing shall meet the performance requirements specified in Section 7.12, Fire Escape Rope Performance Requirements, excluding 7.12.2.

7.10.2 Fire escape webbing shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope*, and shall have a minimum perimeter of 25 mm (1. in). For the purpose of reporting, the perimeter of all new escape webbing shall be rounded to the nearest ½ mm (1/64 in.).

7.10.3 Fire escape webbing shall be tested for high temperature exposure as specified in Section 8.15, Elevated Temperature Rope Test. This test shall be conducted at two independent conditions and shall have a minimum time to failure of 45 seconds at 600°C while holding 300 lb and of 5 minutes at 400°C while holding 300 lb.

7.11 Escape System Performance Requirements.

7.11.1 Escape systems shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 13.5 kN (3034 lbf) without failure.

7.11.2 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.11.3 All fiber and thread utilized in the construction of the escape systems and system components shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis,* and shall have a melting point of not less than 204°C (400°F).

7.11.4 All escape system equipment and system component product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.11.5 Where the escape descent control device incorporates a passive or active breaking feature that creates friction between the device and the rope, the system shall be tested for maximum payout force as specified in Section 8.13, Payout Test, and shall not release the test torso and shall not exceed 90 N (20 lb).

7.11.6 Where an escape system is designated as a fire escape system, additional tests as specified in 7.11.6.1 and 7.11.6.2 shall be conducted.

7.11.6.1 Fire escape system rope shall be tested for high-temperature exposure as specified in Section 8.15, Elevated Temperature Rope Test. This test shall be conducted at two independent conditions and shall have a minimum time to failure of 45 seconds at 600°C while holding 300 lb and of 5 minutes at 400°C while holding 300 lb.

7.11.6.2 Where escape anchors are represented as being flame-resistant, materials, labels, and hardware shall be tested individually for heat resistance as specified in Section 8.17, Heat Resistance Test, and shall not melt, drip, separate, or ignite; hardware items shall remain functional.

7.12* Fire Escape Rope Performance Requirements.

7.12.1* Fire escape rope shall be tested for breaking strength and elongation as specified in Section 8.2, Rope Breaking and Elongation Test, and shall have a minimum breaking strength of not less than 13.5 kN (3034 lbf); the minimum elongation shall not be less than 1 percent at 10 percent of breaking strength; and the maximum elongation shall not be more than 10 percent at 10 percent of breaking strength.

7.12.2* Fire escape rope shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope*, and shall have a diameter of at least 7.5 mm (19⁄64 in.) but less than 9.5 mm (3⁄8 in.). For the purpose of reporting, the calculated diameter of all new fire escape rope shall be rounded to the nearest 0.5 mm (1⁄64 in.).

7.12.3* Fiber utilized for all fire escape rope shall be tested for melting in accordance with ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.12.4 Fire escape rope product labels and identification tape shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, shall remain in place, and shall not be torn or otherwise damaged.

7.12.5 Fire escape rope shall be tested for high-temperature exposure as specified in Section 8.15, Elevated Temperature Rope Test. This test shall be conducted at two independent conditions and shall have a minimum time to failure of 45 seconds at 600°C while holding 300 lb and of 5 minutes at 400°C while holding 300 lb.

7.13 Manufacturer-Supplied Eye Termination.

7.13.1 Manufacturer-supplied eye termination shall be tested for breaking strength as specified in Section 8.2, Rope Breaking and Elongation Test, and shall meet one of the following criteria:

(1) It shall have a minimum breaking strength of not less than 85 percent of the certified rope's calculated minimum breaking strength, as determined by the certifying organization.
(2) It shall have a minimum breaking strength of not less than 20 kN (4496 lbf) for technical use life safety rope.
(3) It shall have a minimum breaking strength of not less than 40 kN (8992 lbf) for general use life safety rope.
(4) It shall have a minimum breaking strength of not less than 13.5 kN (3034 lbf) for escape rope.
(5) It shall have a minimum breaking strength of not less than 13.5 kN (3034 lbf) for throwline.
(6) It shall have a minimum breaking strength of not less than 13.5 kN (3034 lbf) for fire escape rope.

7.13.2 All thread used in the construction of manufacturer-supplied eye termination shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, and shall have a melting point of not less than 204°C (400°F).

7.13.3 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8, Corrosion Resistance Test, and metals inherently resistant to corrosion, including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.14 Moderate Elongation Laid Life Saving Rope Performance Requirements.

7.14.1 Moderate elongation laid life saving rope shall be tested for breaking strength and elongation as specified in Section 8.2, Rope Breaking and Elongation Test, and shall have a minimum breaking strength of not less than 40 kN (8992 lbf); the minimum elongation shall not be less than 1 percent at 10 percent of breaking strength and the maximum elongation shall not be more than 25 percent at 10 percent of breaking strength.

7.14.2 Moderate elongation laid life saving rope shall be tested for size as specified in Section 9.1 of Cordage Institute Standard CI 1805, *3-Strand Life Safety Rope, Moderate Stretch,* and shall have a diameter of 11 mm (7⁄16 in.) or greater but less than or equal to 16 mm (5⁄8 in.). For the purpose of reporting, the calculated diameter of all new three-strand life saving rope shall be rounded to the nearest 0.5 mm (1⁄64 in.).

7.14.3* Fiber utilized for all moderate elongation laid life saving rope shall be tested for melting as specified in ASTM E 794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis,* and shall have a melting point of not less than 204°C (400°F).

7.14.4 Moderate elongation laid life saving rope product labels and identification tape shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, and shall be legible, shall remain in place, and shall not be torn or otherwise damaged.

7.15 Belay Device Performance Requirements.

7.15.1 Technical use belay devices shall be tested for breaking strength as specified in Section 8.6. Manner of Function Tensile Test, Procedure C without failure of the device or failure of the rope.

7.15.2 General use belay devices shall be tested for breaking strength as specified in Section 8.6, Manner of Function Tensile Test, Procedure C, without failure of the device or failure of the rope, with a belay system extension of less than 1 m, and with an impact force of less than 15 kN (3372 lbf).

7.16 Escape Anchor Device Performance Requirements.

7.16.1 Escape anchor devices shall be tested for strength as specified in Section 8.7, Breaking Strength Test, Procedure B, and shall have a minimum tensile strength of at least 13.5 kN (3034 lbf).

7.16.2 Permanently attached escape anchor device product labels shall be tested for legibility as specified in Section 8.10, Product Label Durability Test, shall be legible, and shall not be torn or otherwise damaged.

7.16.3 All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 8.8. Corrosion Resistance Test, and metals inherently resistant to corrosion including but not limited to stainless steel, brass, copper, aluminum, and zinc shall show no more than light surface–type corrosion or oxidation. Ferrous metals shall show no corrosion of the base metal. All hardware shall remain functional as specified in the manufacturer's operating instructions.

7.16.4 Escape anchor devices constructed of nonmetallic materials shall be tested for heat resistance as specified in Section 8.17, Heat Resistance Test, and shall not melt, drip, separate, or ignite; hardware items shall remain functional.

7.17 Escape Descent Control Device Performance Requirements. Escape descent control devices and systems shall be tested for maximum impact force as specified in Section 8.14, Escape Descent Control Device and Systems Drop Test, shall have the maximum impact force not exceed 8.0 kN (1798.5 lbf), shall not damage the rope or device, and shall remain functional.

Chapter 8 Test Methods

8.1 Sample Preparation Procedures.

8.1.1 Application.

8.1.1.1 The sample preparation procedures contained in this section shall apply to each test method in this chapter, as specifically referenced in the sample preparation section of each test method.

8.1.1.2 Only the specific sample preparation procedure or procedures referenced in the sample preparation section of each test method shall be applied to that test method.

8.1.2 Room Temperature Conditioning Procedure.

8.1.2.1 Samples shall be conditioned at a temperature of 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65 percent ± 5 percent for at least 24 hours.

8.1.2.2 Specimens shall be tested within 5 minutes after removal from conditioning.

8.2 Rope Breaking and Elongation Test.

8.2.1 Application.

8.2.1.1 This test shall apply to life safety rope, moderate elongation laid life saving rope, escape rope, throwline, webbing, and manufacturer-supplied eye termination.

8.2.1.2 Modifications to this test method for testing throwline shall be as specified in 8.2.7.

8.2.1.3 Modifications to this test method for testing manufacturer-supplied eye termination shall be as specified in 8.2.8.

8.2.2 Sample.

8.2.2.1 Samples for conditioning shall be at least 1 m (1 yd) length of rope for each rope model.

8.2.2.2 Samples shall be conditioned as specified in 8.1.2.

8.2.2.3 All samples for each rope model shall be taken from the same production lot.

8.2.3 Specimens.

8.2.3.1 Specimens shall be as specified in Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope.*

8.2.3.2 A minimum of five specimens shall be tested.

8.2.4* Procedure. Specimens shall be tested for elongation and minimum breaking strength in accordance with Sections 8 and 9 of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope.*

8.2.5 Report.

8.2.5.1 The rope minimum breaking strength shall be determined by subtracting three standard deviations from the mean result of five samples from the same production lot and shall be reported to the nearest 1 N.

8.2.5.2 The standard deviation shall be calculated using the formula:

$$s = \sqrt{\frac{n\left(\sum x^2\right) - \left(\sum x\right)^2}{n(n-1)}}$$

where:
s = standard deviation
n = number of samples
x = breaking strength

8.2.5.3 The elongation at 10 percent of the minimum breaking strength shall be reported to the nearest 0.1 percent.

8.2.5.4 The elongation at 1.35 kN (300 lbf), 2.7 kN (600 lbf), and 4.4 kN (1000 lbf) shall be reported to the nearest 0.1 percent.

8.2.6 Interpretation.

8.2.6.1 Pass/fail performance shall be based on the standard deviation from the mean breaking strength and the elongation at 10 percent of the minimum breaking strength.

8.2.6.1.1 The values obtained in 8.2.5.4 shall not be used to determine pass/fail.

8.2.6.2 One or more specimens failing this test shall constitute failing performance for the rope type.

8.2.7 Specific Requirements for Testing Throwline.

8.2.7.1 For specimens of throwline, only breaking strength testing shall be conducted.

8.2.7.2 Elongation shall not be evaluated.

8.2.8 Specific Requirements for Testing Manufacturer-Supplied Eye Termination.

8.2.8.1 For specimens of manufacturer-supplied eye terminations, only breaking strength testing shall be conducted.

8.2.8.2 Elongation shall not be evaluated.

8.2.8.3 Eye termination shall be connected to test apparatus with test pin.

8.2.8.4 Where testing is being conducted on manufacturer-supplied eye termination and the rope or webbing used in the manufacturer-supplied eye termination is certified as a life safety rope with a diameter of less than 12 mm as escape webbing, an escape rope, or a throwline, then a connector with a cross-sectional 6 mm ± 0.05 mm radii shall be used.

8.2.8.5 Where testing is being conducted on manufacturer-supplied eye termination and the rope used in the manufacturer-supplied eye termination is certified as a life safety rope with diameter of 12 mm or greater, then a connector with a cross-sectional 8 mm ± 0.05 mm radii shall be used.

8.3 Static Test.

8.3.1 Application.

8.3.1.1 This test shall apply to ladder belts, escape belts, and Class II and Class III life safety harness.

8.3.1.2 Each model of a belt or a life safety harness shall be tested in accordance with Table 8.3.1.2, as appropriate for the product.

8.3.1.3 Modifications to this test method for testing Class II harness shall be as specified in 8.3.8.

8.3.1.4 Modifications to this test method for testing Class III harness shall be as specified in 8.3.9.

8.3.1.5 Modifications to this test method for testing ladder belts shall be as specified in 8.3.10.

8.3.1.6 Modifications to this test method for testing escape belts shall be as specified in 8.3.11.

8.3.1.7 Modifications to this test method for testing positioning attachments shall be as specified in 8.3.12.

8.3.1.8 Modifications to this test method for testing Class II victim extrication devices shall be as specified in 8.3.13.

8.3.1.9 Modifications to this test method for testing Class III victim extrication devices shall be as specified in 8.3.14.

8.3.2 Samples.

8.3.2.1 Samples for conditioning shall be whole items.

8.3.2.2 Samples shall be conditioned as specified in 8.1.2.

8.3.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model being tested.

8.3.3 Specimens.

8.3.3.1 Specimens shall be whole items.

8.3.3.2* A minimum of three specimens shall be tested for each test.

8.3.4 Apparatus. The rigid test torso specified in Figure 1 of ASTM F 1772, *Standard Specification for Climbing Harnesses*, shall be used with the following modifications, as shown in Figure 8.3.4:

(1) The legs shall be 310 mm ± 30 mm (12 in. ± 1 in.) in length.
(2) The distance between the inner thighs at the crotch shall be 50 mm ± 5 mm (2 in. ± ¼ in.).

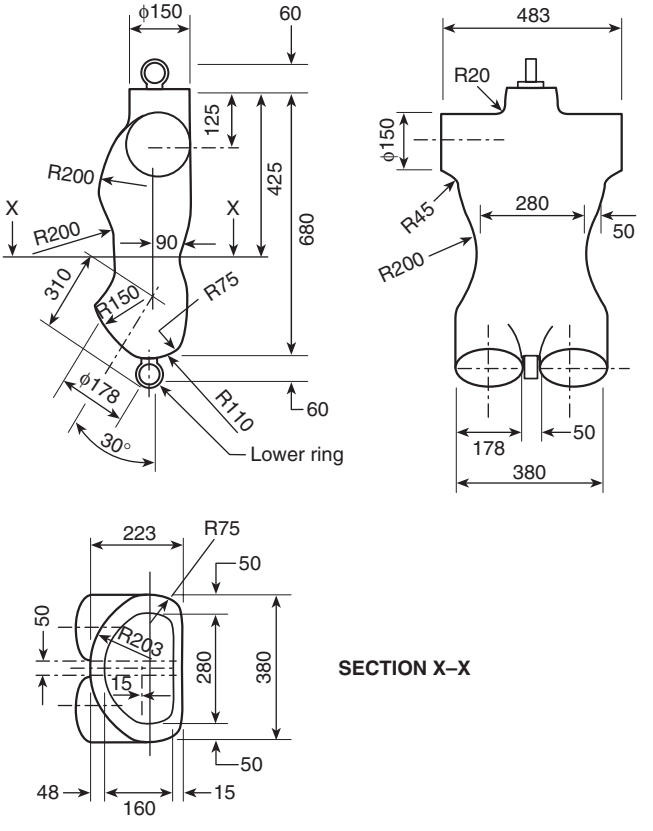
8.3.4.1 The test torso shall weigh 136 kg ± 1 kg (300 lb ± 2¼ lb).

8.3.4.2 The test torso with the sample harness attached shall be identified as the test mass.

8.3.5 Procedure.

8.3.5.1 The specimen shall be donned on the rigid test torso as specified in the manufacturer's user instructions.

8.3.5.2 The test mass shall be attached to the test machine at the load-bearing attachment point, in accordance with the manufacturer's instruction for use, with a suitable locking carabiner.



Notes:
Waist circumference at X–X is 750 mm.
All linear dimensions are in millimeters, ±5 mm.
The dimensions are those of a dummy developed by the UIAA for testing harnesses.

FIGURE 8.3.4 Outline of the Test Torso.

Table 8.3.1.2 Static Test Matrix

Test	Class II	Class III	Ladder Belt	Victim Escape Belt	Class II Extrication Device	Class III Extrication Device
Upright	YES	YES	YES	YES	YES	YES
Head down	NO	YES	NO	NO	NO	YES
Horizontal	NO	NO	YES	NO	NO	YES

8.3.5.3 The test mass shall be properly positioned by preloading up to 800 N (181 lbf) with the test torso in the required position.

8.3.5.4 Under the load specified in 8.3.5.3, the load-bearing attachment point(s) shall be placed approximately symmetrically about the vertical axis of the test torso as shown in Figure 8.3.5.4.

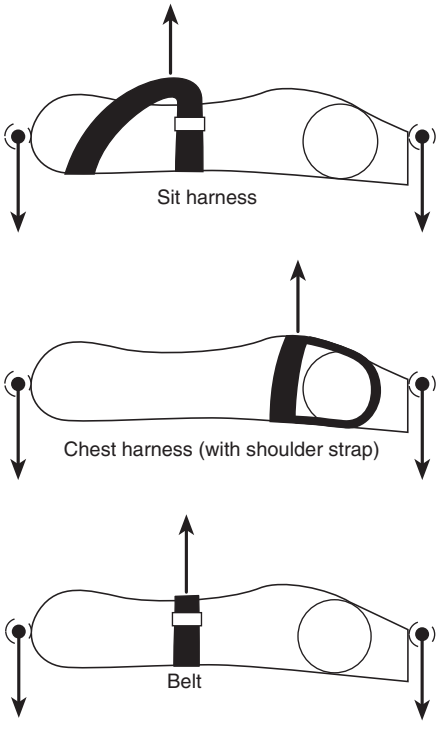


FIGURE 8.3.5.4 Test Torso Orientations for Harness Test and Belt Test.

8.3.5.5 For the upright position, the test torso shall be oriented in an upright position. For the head-down position, the test torso shall be oriented in a head-down position. For the horizontal position, the test torso shall be oriented in a horizontal position supported by the neck and buttocks rings.

8.3.5.5.1 For the upright position, the force shall be applied to the buttocks ring, increasing to the specified load for the type of device over a period of 2 minutes +15/−0 seconds.

8.3.5.5.2 For the head-down position, the force shall be applied to the neck ring, increasing to the specified load for the type of device over a period of 2 minutes +15/−0 seconds.

8.3.5.5.3 For the horizontal position, the force shall be applied to the neck and buttocks rings in the plane of symmetry of the test torso and normal to its axis as shown in Figure 8.3.5.4, increasing to the specified load for the type of device over a period of 2 minutes +15/−0 seconds.

8.3.5.6 The specified load for the type of device being tested shall be held for 1 minute +15/−0 seconds and then tension shall be completely released over a maximum of 1 minute.

8.3.5.7 The specified load for the type of device being tested shall be reapplied immediately and held for 5 minutes +15/−0 seconds before release.

8.3.5.8 The sample shall be evaluated at the conclusion of each static test series.

8.3.6 Report.

8.3.6.1 For each position tested, any release from the test torso shall be reported.

8.3.6.2 For each position tested, the amount of slip of any buckles and adjustment devices shall be reported.

8.3.6.3 For each position tested, any visible signs of damage that would affect the function of the harness shall be reported.

8.3.6.4 Any methods of tie-off of webbing ends shall be reported.

8.3.7 Interpretation.

8.3.7.1 Any release from the test torso shall constitute failing performance.

8.3.7.2 The amount of slip of any buckles and adjustment devices shall be used to determine pass/fail.

8.3.7.3 A harness shall be considered to be damaged to the point of failing this test if any condition that compromises the safety of the user such as but not limited to any load-bearing material being torn or damaged or where a buckle becomes nonfunctional.

8.3.8 Specific Requirements for Testing Class II Harness.

8.3.8.1 Class II harness shall be tested in the upright position, as specified in Table 8.3.1.2.

8.3.8.2* The load applied for the upright position shall be 16 kN (3597 lbf).

8.3.9 Specific Requirements for Testing Class III Harness.

8.3.9.1 Class III harness shall first be tested in the upright position, followed by the head-down position, as specified in Table 8.3.1.2.

8.3.9.2* The load applied for the upright position shall be 16 kN (3597 lbf), and the load applied for the head-down position shall be 10 kN (2248 lbf).

8.3.9.3 Where sample Class III life safety harness include shoulder attachment points, such shoulder attachment points shall be tested only as specified in 8.3.5.5.1 for the upright position as a pair using an appropriate spreader device.

8.3.10 Specific Requirements for Testing Ladder Belts.

8.3.10.1 Ladder belts shall first be tested in the upright position, followed by the horizontal position as specified in Table 8.3.1.2.

8.3.10.2* The load applied for the upright position shall be 13 kN (2923 lbf) and the load applied for the horizontal position shall be 10 kN (2248 lbf).

8.3.11 Specific Requirements for Testing Escape Belts.

8.3.11.1 Escape belts shall first be tested in the upright position, as specified in Table 8.3.1.2.

8.3.11.2* The load applied for the upright position shall be 13 kN (2923 lbf).

8.3.12 Specific Requirements for Testing Positioning Attachments.

8.3.12.1 Where used on ladder belts, side D-rings and attachment points designated by the manufacturer for use as positioning attachments only shall be tested as positioning attachments and shall be tested as specified in 8.3.5.5.1 for the upright position and 8.3.5.5.3 for the horizontal position.

8.3.12.1.1 The load applied for the upright position shall be 13 kN (2923 lbf) and the load applied for the horizontal position shall be 10 kN (2248 lbf).

8.3.12.2 Where used on escape belts and harnesses, side D-rings and attachment points designated by the manufacturer for use as positioning attachments only shall be tested as positioning attachments and shall be tested as specified in 8.3.5.5.1 for the upright position.

8.3.12.2.1 The load applied for the upright position shall be 13 kN (2923 lbf).

8.3.13 Specific Requirements for Testing Class II Victim Extrication Devices.

8.3.13.1 Class II victim extrication devices shall be tested in the upright position as specified in Table 8.3.1.2.

8.3.13.2* The load applied for the upright position shall be 16kN (3597 lbf).

8.3.14 Specific Requirements for Testing Class III Victim Extrication Devices.

8.3.14.1 Class III victim extrication devices shall be tested in the upright position, followed by the head-down position, then followed by the horizontal position as specified in Table 8.3.1.2.

8.3.14.2* The load applied for the upright position shall be 16 kN (3597 lbf), and the load applied for the head-down and horizontal positions shall be 10 kN (2248 lbf).

8.4 Drop Test.

8.4.1 Application.

8.4.1.1 This test shall apply to life safety harness and escape belts.

8.4.1.2 Each model of escape belts or life safety harness shall be tested in accordance with Table 8.4.1.2 as appropriate for the type of belt and class of harness.

8.4.1.3 Modifications to this test method for testing escape belts shall be as specified in 8.4.8.

8.4.1.4 Modifications to this test method for testing life safety harness shall be as specified in 8.4.9.

8.4.2 Samples.

8.4.2.1 Samples for conditioning shall be whole items.

8.4.2.2 Samples shall be conditioned as specified in 8.1.2.

8.4.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8.4.3 Specimens.

8.4.3.1 Specimens shall be whole items.

8.4.3.2* A total of three specimens shall be tested for each test.

8.4.4 Apparatus.

8.4.4.1 The rigid test torso specified in Figure 1 of ASTM F 1772, *Standard Specification for Climbing Harnesses*, shall be used with the following modifications, as shown in Figure 8.3.4:

(1) The legs shall be 310 mm ± 30 mm (12 in. ± 1 in.) in length.
(2) The distance between the inner thighs at the crotch shall be 50 mm ± 5 mm (2 in. ± ¼ in.).

8.4.4.1.1 The test torso shall weigh 136 kg ± 1 kg (300 lb ± 2¼ lb).

8.4.4.1.2 The test torso with the sample harness attached shall be identified as the test mass.

8.4.4.2 A drop tower shall be used and shall have an anchorage point that shall not have a deflection greater then 1 mm (0.04 in.) when a force of 10 kN (2250 lbf) is applied.

8.4.4.3 A test lanyard shall be used to connect the load-bearing attachment point(s) to the test mass and shall be fabricated from Type 302 stainless steel, 7 × 19 aircraft cable construction in accordance with MIL-W-83420D, Military Specification: *General Specification for Flexible Wire Rope for Aircraft Control.*

8.4.4.3.1 The test lanyard shall be 9.5 mm (⅜ in.) in diameter and 1.2 m ± 13 mm (47 in. ± ½ in.) in length measured from bearing point to bearing point between snap hooks when the lanyard is under tension of 50 N (11 lbf).

8.4.4.3.2 The lanyard shall be equipped with a snap hook at each end.

8.4.4.3.3 The lanyard shall be connected to the load-bearing attachment point(s) of the test mass.

8.4.4.3.4 The lanyard ends shall be finished with swaged eyes in such a manner as to prevent slippage of the eyes and snap hooks that would change the length of the test lanyard.

8.4.5 Procedure.

8.4.5.1 The specimen shall be donned on the rigid test torso as specified in the manufacturer's user instructions, and the test torso shall be connected to the drop tower anchorage point.

8.4.5.2 One end of the test lanyard shall be attached to a load-bearing attachment point, and the other end shall be attached to the anchorage.

8.4.5.3 The attachment point of the sample on the test mass shall be raised to and released from a point no more than 305 mm (12 in.) horizontally from the anchorage.

8.4.5.4 The attachment point of the sample on the test mass shall be in a position that will allow it to fall freely a distance of 1 m (39 in.) to a free-hanging position without interference or obstruction or striking the floor, ground, or any other object during the test.

8.4.6 Report. For each sample tested during the drop test series, the result of each drop test shall be individually reported for each anchorage point.

Table 8.4.1.2 Harness Drop Test Matrix

Test	Class II	Class III	Ladder Belt	Escape Belt
Drop	YES	YES	NO	YES

8.4.6.1 Any methods of tie-off of webbing ends shall be reported.

8.4.7 Interpretation. A specimen shall be considered to have failed the test if, during any one of the required drops for any sample, the test mass impacts the ground.

8.4.8 Specific Requirements for Testing Escape Belts.

8.4.8.1 Each model of belt shall be tested according to Table 8.4.1.2 for the appropriate belt type.

8.4.8.2 A minimum of two drop tests shall be conducted for each specimen.

8.4.8.2.1 The first drop test shall be conducted for each load-bearing attachment point with the test mass in a head-up position.

8.4.8.2.2 The second drop test shall be conducted for each load-bearing attachment point with the test mass in a head-down position.

8.4.8.2.3 A minimum of 5 minutes shall pass between consecutive drops.

8.4.9 Specific Requirements for Testing Life Safety Harness.

8.4.9.1 Each model of harness shall be tested according to Table 8.4.1.2 for the appropriate class harness.

8.4.9.2 A minimum of two drop tests shall be conducted for each specimen.

8.4.9.2.1 The first drop test shall be conducted for each load-bearing attachment point with the test mass in a head-up position.

8.4.9.2.2 The second drop test shall first be conducted for each load-bearing attachment point with the test mass in a head-down position.

8.4.9.2.3 A minimum of 5 minutes shall pass between consecutive drops.

8.5 Carabiner and Snap-Link Tensile Test.

8.5.1 Application. This test method shall apply to all carabiners and snap links.

8.5.2 Samples.

8.5.2.1 Samples for conditioning shall be whole items.

8.5.2.2 Samples shall be conditioned as specified in 8.1.2.

8.5.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specification for the model being tested.

8.5.2.4 Samples shall be taken from the same production lot for each model tested.

8.5.3 Specimens.

8.5.3.1 Specimens shall be whole items.

8.5.3.2 A total of five specimens shall be tested for each performance requirement.

8.5.3.3 A separate specimen shall be used for each test.

8.5.4 Procedure. Test methods shall be conducted per ASTM F 1956, *Standard Specification for Rescue Carabiners.*

8.5.5 Report.

8.5.5.1 The breaking strength of each specimen shall be reported to the 0.1 kN (23 lb) of force.

8.5.5.2 An average breaking strength shall be calculated for each position tested.

8.5.5.3 The carabiner minimum breaking strength shall be determined by subtracting three standard deviations from the mean results of five samples from the same production lot and shall be reported to the nearest 0.1 kN (23 lbf). The minimum breaking strength shall be provided on the product label as specified in Section 5.1, Product Label Requirements.

8.5.5.4 The standard deviation shall be calculated using the formula in 8.2.5.2.

8.5.6 Interpretation.

8.5.6.1* Pass/fail performance shall be based on the minimum breaking strength for each of the positions tested.

8.5.6.2 Failure in any position constitutes failure for the carabiner or snap link.

8.6 Manner of Function Tensile Test.

8.6.1 Application.

8.6.1.1 This test shall apply to ascending devices, rope grab devices, descent control devices, and belay devices.

8.6.1.2 Modifications to this test method for testing ascending devices and rope grab devices shall be as specified in 8.6.7.

8.6.1.3 Modifications to this test method for testing descent control devices shall be as specified in 8.6.8.

8.6.1.4 Modifications to this test method for testing belay devices shall be as specified in 8.6.4.5.

8.6.2 Samples.

8.6.2.1 Samples for conditioning shall be whole items.

8.6.2.2 Samples shall be conditioned as specified in 8.1.2.

8.6.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8.6.3 Specimens.

8.6.3.1 Specimens shall be whole items.

8.6.3.2 A total of five specimens shall be tested.

8.6.3.3 Each specimen shall be tested to both Procedure A and Procedure B.

8.6.4 Procedure.

8.6.4.1 Testing shall be conducted in the "manner of function" for the item being tested.

8.6.4.2 Testing shall be conducted using both the smallest and largest diameter life safety rope specified by the device manufacturer for testing.

8.6.4.2.1 Testing shall be conducted using a rope with the same NFPA designation as the device being tested, unless such rope is outside of the range of ropes that the manufacturer specifies for the safe and critical function of the device.

8.6.4.2.2 The rope used for testing shall meet the static rope requirements of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope.*

8.6.4.2.3 The device shall be attached to the rope according to the manufacturer's instructions.

8.6.4.3 Procedure A.

8.6.4.3.1 One end of the rope shall be anchored on to a tensile testing machine and the device shall be anchored to the other end of the rope. The specified deformation force shall be applied to the device at the normal attachment point at a rate of 25 mm/min ± 5 mm/min (1 in./min ± ¼ in./min).

8.6.4.3.2 The specified deformation force shall be held for 30 seconds +1/–0 second, and then the tension shall be completely released over a maximum of 1 minute.

8.6.4.3.3 The device shall then be inspected for damage to the device or to the rope used for testing.

8.6.4.4 Procedure B.

8.6.4.4.1 Using the same item and test set up as in Procedure A, the load shall then be re-applied to the device until the breaking point of the device.

8.6.4.4.2 The force shall be applied at a rate of 25 mm/min ± 5 mm/min (1 in./min ± ¼ in./min).

8.6.4.4.3* In the case of items that are designed to slip under high load, the rope shall be knotted or the device otherwise blocked to prevent slippage once the device has held at least 5 kN (1124 lbf) for technical use items and 9 kN (2023 lbf) for general use items.

8.6.4.5 Procedure C.

8.6.4.5.1 The belay device shall be tested for function according to ASTM F 2436, *Standard Test Method for Measuring the Performance of Synthetic Rope Rescue Belay Systems Using a Drop Test*, as modified for this standard.

8.6.4.5.2 A rope that is 300 cm ± 0.5 cm shall be used between the bowline test–block contact and the most distal point of the gripping portion of the belay assembly.

8.6.4.5.3 A drop height of 60 cm ± 0.5 cm main shall be used.

8.6.4.5.4 The test mass for a technical use belay device shall be 136 kg (300 lb).

8.6.4.5.5 The test mass for a general use belay device shall be 200 kg (617 lb).

8.6.4.5.6 The parameters specified in 8.6.4.5.6.1 and 8.6.4.5.6.2 shall be evaluated to determine pass/fail.

8.6.4.5.6.1 Maximum extension of the belay system shall be no more than 1 m ± 5 cm.

8.6.4.5.6.2* The device shall be able to release the load in a controlled manner.

8.6.5 Report.

8.6.5.1 The condition of the item and the rope shall be recorded after the deformation load has been applied.

8.6.5.2 The minimum breaking strength shall be determined by subtracting three standard deviations from the mean results of samples from the same production lot and shall be reported to the nearest 1.0 kN (230 lbf). The minimum breaking strength shall be provided on the product label as specified in Section 5.1, Product Label Requirements.

8.6.5.3 The standard deviation shall be calculated using the formula in 8.2.5.2.

8.6.5.3.1 Where the minimum breaking strength exceeds 111 kN (25,000 lbf) without failure, the average breaking strength shall be reported as >111 kN (>25,000 lbf). The product label required in 5.1.6.9 shall also indicate the minimum breaking strength as >111 kN (>25,000 lbf).

8.6.5.4 For Procedure C, the device shall be reported as technical use or general use.

8.6.5.4.1 The extension of the belay system shall be recorded.

8.6.5.4.2 Any damage to the rope, the belay device, or system components shall be recorded.

8.6.6 Interpretation. One or more specimens failing this test shall constitute failing performance for the item being tested.

8.6.6.1 Failure of the rope at a load less than the specified rope minimum breaking strength shall constitute failing performance.

8.6.7 Specific Requirements for Testing Ascent Devices, Rope Grab Devices, and Escape Manufactured Systems.

8.6.7.1* Technical use ascent devices, rope grab devices, and escape manufactured systems shall be tested at a load of 5 kN (1124 lbf) for Procedure A.

8.6.7.2 General use ascending devices and rope grab devices shall be tested at a load of 11 kN (2500 lbf) for Procedure A.

8.6.8 Specific Requirements for Testing Descent Control Devices.

8.6.8.1 Escape and technical use descent control devices shall be tested at a load of 5 kN (1124 lbf) for Procedure A.

8.6.8.2 The device shall be attached to the rope according to the manufacturer's instructions in the locked-off mode of attachment.

8.6.8.3 General use descent control devices shall be tested at a load of 11 kN (2500 lbf) for Procedure A.

8.7 Breaking Strength Test.

8.7.1 Application.

8.7.1.1 This test shall apply to portable anchor devices, other auxiliary equipment, manufactured systems, pick-off straps, anchor straps, multiple configuration straps, and escape anchor devices.

8.7.1.2 Specific requirements for testing portable anchors shall be as specified in 8.7.8.

8.7.1.3 Specific requirements for testing pulleys shall be as specified in 8.7.9.

8.7.1.4 Specific requirements for testing auxiliary equipment systems, system components, and manufactured systems shall be as specified in 8.7.10.

8.7.1.5 Specific requirements for testing end-to-end straps shall be as specified in 8.7.11.

8.7.1.6 Specific requirements for testing escape anchor devices shall be as specified in 8.7.13.

8.7.1.7 Specific requirements for testing multiple configuration straps shall be as specified in 8.7.12.

8.7.2 Samples.

8.7.2.1 Samples for conditioning shall be whole items or systems.

8.7.2.2 Samples shall be conditioned as specified in 8.1.2.

8.7.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model being tested.

8.7.3 Specimens.

8.7.3.1 Specimens shall be whole items or systems.

8.7.3.2 A total of five specimens shall be tested.

8.7.4 Procedure A.

8.7.4.1* The device shall be positioned as required for the type of device being tested in the lowest strength configuration of the device as specified by the manufacturer.

8.7.4.2 A force shall be applied to the device, increasing to the load specified at a rate of 25 mm/min ± 5 mm/min (1 in./min ± ¼ in./min).

8.7.4.3 The force shall be held for 30 seconds, ± 1.0 second, and then the tension shall be completely released over a maximum of 1 minute.

8.7.4.4 The force shall be reapplied immediately and shall be increased to the same maximum force as previously exerted and held for 1 minute +15/−0 seconds before release.

8.7.4.5 At the conclusion of Procedure A, the specimen device shall be inspected for deformation.

8.7.5 Procedure B.

8.7.5.1* Using a new specimen and the test set up as in Procedure A, the load shall be reapplied to the lowest strength configuration of the device as specified by the manufacturer until the breaking point of the device.

8.7.5.2 The force shall be applied at a rate of 25 mm/min ± 5 mm/min (1 in./min ± ¼ in./min).

8.7.5.3 During testing, where the rope breaks before the device and that breaking strength exceeds the designated use rating required for escape, technical use, or general use, then pins shall be permitted to be used to determine minimum breaking strength.

8.7.6 Report.

8.7.6.1 The minimum breaking strength shall be determined by subtracting three standard deviations from the mean results of five samples from the same production lot and shall be reported to the nearest 0.1 kN (23 lbf). The minimum breaking strength shall be provided on the product label as specified in Section 5.1.

8.7.6.2 The standard deviation shall be calculated using the formula in 8.2.5.2.

8.7.6.3 The deflection of the load-bearing members from their original position shall be recorded.

8.7.6.4 The functionality of adjustment and moving parts shall be recorded.

8.7.6.5 Where applicable, the movement of all base contact points from their original positions shall be recorded.

8.7.6.6 Any condition that would cause the safety of the user to be compromised shall be recorded.

8.7.6.7 Any fracture of the load-bearing members, collapse, or other condition that would cause the user to be dropped shall be reported.

8.7.6.8* The configuration of the attachment of the device to the testing machine shall be recorded and reported.

8.7.7 Interpretation. One or more specimens failing this test shall constitute failing performance for the item being tested.

8.7.8 Specific Requirements for Testing Portable Anchors.

8.7.8.1 Two specimens shall be tested.

8.7.8.2 Where there are multiple load-bearing attachment points, Procedure A and Procedure B shall be repeated for each combination of load-bearing attachment points specified in the manufacturer's instructions.

8.7.8.3 The device shall be attached to the test machine at the load-bearing attachment point, in accordance with the manufacturer's instructions for use, with a suitable locking carabiner.

8.7.8.4 Before testing, the device shall be positioned with all surface contact points securely seated on a flat, unfinished concrete surface in the manner described by the manufacturer's instructions.

8.7.8.5* Where portable anchor devices are designed to be affixed to a base that is not part of the device, the manufacturer shall provide a test base that most closely resembles the structural element to which the device is designed to be affixed.

8.7.8.5.1 The test base shall be completely stable and shall be permitted to be bolted down to prevent movement during the test.

8.7.8.6 The portable anchor device shall be accompanied by all adjuncts required for use as described by the manufacturer's instructions for use.

8.7.8.6.1 Devices shall not be bolted to, tied off, or affixed to the test base in any way unless required to be by the manufacturer for normal use.

8.7.8.6.2 All adjuncts designed by the manufacturer to be used in conjunction with the device, including but not limited to ropes, chains, webbing, rope grabs, and bolts, shall be in place during the test.

8.7.8.7 For Procedure B, each point of contact with the test surface shall be marked in some manner to allow the ability to assess movement of the base during the test.

8.7.8.7.1 For Procedure B, the force specified in 7.6.4.3 for technical use and 7.6.4.4 for general use shall be applied and held for 2 minutes +15/−0 seconds, using the lower of the actual to pass/fail.

8.7.8.8 The test load used for Procedure A shall be 5 kN (1124 lbf) for technical use portable anchors and 13 kN (2923 lbf) for general use portable anchors.

8.7.8.9 For the report, breaking strength shall be the strength specified in 7.6.4.3 for technical use and 7.6.4.4 for general use.

8.7.9 Specific Requirements for Testing Pulleys.

8.7.9.1 Pulleys shall be tested using a wire rope with a diameter equal to or less than the maximum size of rope specified for the pulley and of sufficient strength. The wire rope shall include a swaged loop that fits the pulley being tested.

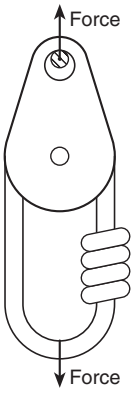


FIGURE 8.7.9.2 Pulley Tensile Test.

8.7.9.2 Tension shall be applied between the wire rope loop and a 12.5 mm (½ in.) pin through the pulley carabiner hole as specified in Figure 8.7.9.2 until failure.

8.7.9.3 Fixture design and device placement in fixture shall not allow the fixture to interfere with the pulley during the test.

8.7.9.4 Pulleys with two or more sheaves shall have a single rope looped around all sheaves and the load applied to each loop.

8.7.9.5 Pulleys that include a becket at the bottom of the pulley shall have the becket tested by applying a load longitudinally between the carabiner hole and the becket.

8.7.9.6 The test load used for Procedure A shall be 5 kN (1124 lbf) for technical use pulleys and 22 kN (4946 lbf) for general use pulleys.

8.7.10 Specific Requirements for Auxiliary Equipment Systems, System Components, and Manufactured Systems.

8.7.10.1 Only Procedure B shall be conducted on auxiliary equipment systems, system components, and manufactured systems.

8.7.10.2 Auxiliary equipment and manufactured systems shall be tested using a rope with a diameter of the smallest and largest size specified by the auxiliary equipment manufacturer.

8.7.10.3 Where there are multiple load-bearing attachment points, Procedure B shall be repeated for each combination of load-bearing attachment points specified in the manufacturer's instructions.

8.7.10.4 The device shall be attached to the test machine at the load-bearing connecting point, in accordance with the manufacturer's instructions for use.

8.7.10.5 For all tests, the device shall be accompanied by all equipment required for use as described by the manufacturer's instructions for use.

8.7.10.6 Only the requirements specified in 8.7.6.1 shall be reported.

8.7.11 Specific Requirements for Testing End-to-End Straps.

8.7.11.1 Only Procedure B shall be conducted on end-to-end straps.

8.7.11.2* Testing shall be conducted using 13 mm ± 1 mm (½ in. ± ⅛ in.) pins, bolts, or shackles. The test fixture shall be designed such that the strap is free to locate itself on the test pins when the force is applied.

8.7.11.3 A test pin cross section shall be permitted to be other than round. Any cross section necessary to prevent test pin failure or any design to prevent test pin rotation shall be permitted, as long as the contact point between the test pin and strap attachment point has the specified radius, material type, hardness, and surface roughness as per ASTM F 1956, *Standard Specification for Rescue Carabiners,* Section 5.2.1.

8.7.11.4 The test fixture shall be designed to prevent the test pins from rotating such that the strap is free to locate itself on the test pins when force is applied.

8.7.11.5 Where the strap is adjustable in length, the strap shall be tested in the shortest length that places the adjustment device free of any interference of the test fixture.

8.7.11.6 Technical use and general end-to-end and load-releasing straps shall be individually tested in the end-to-end configuration.

8.7.11.7 Where the strap is adjustable in length, the slippage of the adjustment device shall be measured and reported upon completion of the test.

8.7.12 Specific Requirements for Testing Multiple Configuration Straps.

8.7.12.1 Only Procedure B shall be conducted on multiple configuration straps.

8.7.12.2* Testing shall be conducted using 13 mm ± 1 mm (½ in. ± ⅛ in.) pins, bolts, or shackles. The test fixture shall be designed such that the strap is free to locate itself on the test pins when the force is applied.

8.7.12.3 Test pin cross section shall be permitted to be other than round. Any cross section necessary to prevent test pin failure or any design to prevent test pin rotation shall be permitted as long as the contact point between the test pin and strap attachment point has the specified radius, material type, hardness, and surface roughness as per ASTM F 1956, *Standard Specification for Rescue Carabiners,* Section 5.2.1.

8.7.12.4 The test fixture shall be designed to prevent the test pins from rotating such that the strap is free to locate itself on the test pins when force is applied.

8.7.12.5 Where the strap is adjustable in length, the strap shall be tested in the shortest length that places the adjustment device free of any interference of the test fixture.

8.7.12.6 Technical use and general use multiple configuration straps shall be individually tested in the basket (U) configuration, the end-to-end configuration, and the choker configuration.

8.7.12.7 For technical use and general use multiple configuration straps, all configuration values shall be reported on the product label. Only the basket (U) configuration value shall be utilized to determine pass/fail.

8.7.13 Specific Requirements for Escape Anchor Devices.

8.7.13.1 Only Procedure B shall be conducted on escape anchor devices.

8.7.13.2 Escape anchor devices with a single point of contact shall be supported to prevent twisting when loaded in such a way that the load is applied in the weakest configuration. The support shall not prevent the device from deforming under load or from releasing from the structure due to deformation or breaking.

8.7.13.3 Escape anchor devices that use two or more points of contact shall have the load applied in the weakest configuration when used in accordance with the manufacturer's instructions.

8.7.13.4 The escape anchor device shall fail the Procedure B test if the device breaks or deforms such that it releases from the supporting structure.

8.7.13.5 Only the requirements specified in 8.7.6.1 shall be reported.

8.8 Corrosion Resistance Test.

8.8.1 Application. This test shall apply to all metal hardware and hardware that includes metal parts.

8.8.2 Samples.

8.8.2.1 Samples for conditioning shall be metal hardware or hardware that includes metal parts.

8.8.2.2 Samples shall be conditioned as specified in 8.1.2.

8.8.3 Specimens.

8.8.3.1 Specimens shall be metal hardware or hardware that includes metal parts.

8.8.3.2 Five specimens of each hardware type shall be tested.

8.8.4 Procedure.

8.8.4.1 Specimens shall be tested in accordance with ASTM B 117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*. Salt spray shall be 5 percent saline solution, and test exposure shall be for 50 hours.

8.8.4.2 Immediately following the test exposure and prior to examination, specimens shall be rinsed under warm, running tap water and dried with compressed air.

8.8.4.3 Specimens shall then be examined visually by the unaided eye to determine pass/fail.

8.8.4.4 The functionality of each specimen shall be evaluated.

8.8.5 Report. The presence of corrosion and the functionality of each specimen shall be reported.

8.8.6 Interpretation. One or more hardware specimens failing this test shall constitute failing performance for the hardware type.

8.9 Floatability Test.

8.9.1 Application. This test shall apply to throwline.

8.9.2 Samples.

8.9.2.1 Samples for conditioning shall be at least 1 m (1 yd) in length.

8.9.2.2 Samples shall be conditioned as specified in 8.1.2.

8.9.3 Specimens.

8.9.3.1 Specimens shall be 1 m (1 yd) in length.

8.9.3.2 A minimum of three specimens shall be tested.

8.9.3.3 The ends of the specimen shall be heat-sealed.

8.9.4 Procedure.

8.9.4.1 Specimens shall be completely immersed in a sufficiently sized vessel of fresh water at a temperature of 21°C ± 3°C (70°F ± 5°F) for a period of 24 hours +1/−0 hour.

8.9.4.2 The throwline shall then be allowed, over a maximum of 1 minute, to float to the surface.

8.9.5 Report. Observation of each specimen's ability to float within 1 minute shall be reported.

8.9.6 Interpretation. The entire length of the throwline shall float to constitute passing performance.

8.10 Product Label Durability Test.

8.10.1 Application.

8.10.1.1 This test method shall apply to permanently attached product labels and identification tapes, excluding metal stamped or engraved labels.

8.10.1.2 Specific requirements for testing rope and throwline identification tapes shall be specified in 8.10.7.

8.10.1.3 Specific requirements for testing all other labels shall be specified in 8.10.8.

8.10.2 Samples.

8.10.2.1 Samples for conditioning shall be individual labels or, in the case of rope or throwline, at least 1 m (1 yd) in length.

8.10.2.2 Samples shall be conditioned as specified in 8.1.2.

8.10.3 Specimens.

8.10.3.1 Specimens shall be individual labels or, in the case of rope or throwline, 1 m (1 yd) in length.

8.10.3.2 A minimum of four of each type of label shall be tested.

8.10.3.3 Where labels have "write-in" information, two additional specimens shall be tested that include those areas with sample information written in.

8.10.4 Procedures.

8.10.4.1 Abrasion Durability Test.

8.10.4.1.1 Product label specimens shall be subjected to abrasion in accordance with ASTM D 4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics*, with the following modifications:

(1) The standard abrasive fabric and the felt-backing fabric shall be soaked for 24 hours or agitated in distilled water so that they are thoroughly wet.
(2) The standard abrasive fabric shall be rewetted after each set of cycles by applying 20 ml (0.68 oz) of distilled water from a squeeze bottle by squirting on the center of the abrasive pad.
(3) At least two specimens shall be subjected to 10 dry cycles, 160 revolutions, of the test apparatus.
(4) At least two specimens shall be subjected to 5 wet cycles, 80 revolutions, of the test apparatus.
(5) At least one dry and one wet test specimen shall be edge specimens.
(6) Where labels include "write-in" information at least one sample shall be tested in the dry condition and one specimen shall be tested in the wet condition.

8.10.4.1.2 Specimens shall be examined for legibility to the unaided eye by a person with 20/20 vision or vision corrected to 20/20 at a nominal distance of 305 mm (12 in.) in a well-illuminated area.

8.10.4.2 Laundering Durability Test.

8.10.4.2.1 Specimens shall be subjected to five cycles of laundering using Machine Cycle 1 and Wash Temperature V of AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*.

8.10.4.2.2 A 1.8 kg ± 0.1 kg (4.0 lb ± ¼ lb) load shall be used. A laundry bag shall not be used.

8.10.4.2.3 Specimens shall be examined for legibility to the unaided eye by a person with 20/20 vision or vision corrected to 20/20 at a nominal distance of 305 mm (12 in.) in a well-illuminated area.

8.10.4.2.4 Specimens shall be examined to determine if the label remained in place.

8.10.5 Report.

8.10.5.1 The legibility for each specimen shall be recorded and reported as acceptable or unacceptable.

8.10.5.2 For rope and throwline, the ability of the label to remain in place shall be reported.

8.10.6 Interpretation. One or more label specimens failing this test shall constitute failing performance.

8.10.7 pecific Requirements for Testing Rope and Throwline Labels. All rope and throwline inserted identification tapes shall be tested only for laundering durability as specified in 8.10.4.2.

8.10.8 Specific Requirements for Testing All Other Labels. All harness and belt product labels shall be tested only for abrasion durability as specified in 8.10.4.1.

8.11 Holding Test.

8.11.1 Descent control devices shall be tested in accordance with ISO 22159, *Personal equipment for protection against falls — Descending Devices*, Section 5.5.

8.11.2 Samples.

8.11.2.1 Samples for conditioning shall be whole items.

8.11.2.2 Samples shall be conditioned as specified in 8.1.2.

8.11.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model being tested.

8.11.3 Specimens.

8.11.3.1 Specimens shall be whole items.

8.11.3.2 Three specimens shall be tested.

8.11.4 Procedure.

8.11.4.1 Testing shall be conducted using both the smallest and largest diameter life safety rope specified by the descent control device manufacturer for testing.

8.11.4.2 The rope used for testing shall meet the static rope requirements of Cordage Institute Standard CI 1801, *Low Stretch and Static Kernmantle Life Safety Rope*.

8.11.4.3 The descent control device shall be attached to the rope according to the manufacturer's instructions.

8.11.4.4 One end of the rope shall be anchored on to a tensile testing machine and the descent control device with passive brake deployed shall be anchored to the other end of the rope. A force shall be applied to the device at the normal attachment point at a rate of 25 mm/min ± 5 mm/min (1 in./min ± ¼ in./min).

8.11.4.4.1 The force for escape and technical use descent control devices shall be 1.35 kN (300 lbf) and for general use descent control devices shall be 2.7 kN (600 lbf).

8.11.4.5 The specified deformation force shall be held for 30 seconds +1/–0 second, and then the tension shall be completely released over a maximum of 1 minute.

8.11.4.5.1 Any slippage of the descent control device on the rope shall then be measured.

8.11.5 Report. The slip of the descent device at the specified load shall be reported.

8.11.6* Interpretation. One or more specimens failing this test shall constitute failing performance for the item being tested.

8.12 Litter Strength Test.

8.12.1 Application. This test shall apply to litters.

8.12.2 Samples.

8.12.2.1 Samples for conditioning shall be whole items.

8.12.2.2 Samples shall be conditioned as specified in 8.1.2.

8.12.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model being tested.

8.12.3 Specimens.

8.12.3.1 Specimens shall be whole items.

8.12.3.2 A minimum of two specimens shall be tested in the horizontal position.

8.12.3.3 A minimum of two specimens shall be tested in the vertical position.

8.12.4 Apparatus. The apparatus shall be as specified in ASTM F 2821, *Standard Test Methods for Basket Type Rescue Litters*.

8.12.5 Procedure. Litters shall be tested as specified in ASTM F 2821, *Standard Test Methods for Basket Type Rescue Litters*, with the modification that both the horizontal litter test and the vertical litter test shall be performed on separate specimens.

8.12.6 Report.

8.12.6.1 The breaking strength of each specimen shall be reported to the nearest 0.1 kN (23 lbf) force.

8.12.6.2 Deformation of the structural element shall be reported to the nearest 0.5 cm (0.2 in.).

8.12.6.3 The lowest observed breaking strength shall be reported as the labeled breaking strength for each vertical and horizontal configuration.

8.12.7 Interpretation.

8.12.7.1 Failure of the device prior to the application of the 11 kN (2473 lbf) test load shall constitute failure of the litter.

8.12.7.2 Deformation of any structural element of more than 5 cm ± 0.5 cm (2 in. ± 0.2 in.) during testing shall constitute failure of the litter.

8.13 Payout Test.

8.13.1 Application.

8.13.1.1 This test shall apply to descent control systems with passive and active braking systems, and escape manufactured systems.

8.13.2 Samples.

8.13.2.1 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8.13.2.2 The rope length available for testing shall be at least 1.5 m (5 ft).

8.13.2.3 The descent control system shall be tested with each type of rope for its intended use.

8.13.2.4 If multiple configurations are possible with the descent control device, it shall be tested in each configuration.

8.13.3 Specimens.

8.13.3.1 Specimens shall be whole items.

8.13.3.2 A total of three specimens shall be tested and each test repeated 5 times.

8.13.4 Procedure.

8.13.4.1 Specimens shall be tested in a servohydraulic or screw-driven load frame with a controlled displacement rate of 100 mm/sec.

8.13.4.2 For descent control devices with the capability to vary friction with the rope, the device shall be locked open in the configuration the manufacturer recommends for actual use. The manner of locking the device shall not affect the load measurement during payout.

8.13.4.3 The rope shall be attached to a solid anchorage point and the descent control device attached to the moving crosshead of the load frame. The rope shall enter the descent device directly without creating additional friction throughout the test.

8.13.4.4 Each test shall require the rope to pass through the descent control device for a minimum of 100 mm (4 in.).

8.13.5 Report. The maximum force encountered over the 100 mm (4 in.) payout shall be recorded from each test and the average and standard deviation calculated.

8.13.6 Interpretation.

8.13.6.1 Pass/fail performance shall be based on the maximum force required to payout rope through the descent control device.

8.13.6.2 One or more specimens failing this test shall constitute a failing performance for the given rope type.

8.13.6.3 If multiple configurations are possible with the descent control device, the pass/fail criteria shall be applied for each configuration.

8.13.6.4 The compliant configuration shall be listed in the user instructions.

8.14 Escape Descent Control Device and Systems Drop Test.

8.14.1 Application. This test shall apply to escape descent control devices and escape manufactured systems.

8.14.2 Samples.

8.14.2.1 Samples for conditioning shall be whole items.

8.14.2.2 Samples shall be conditioned as specified in 8.1.2.

8.14.2.3 Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8.14.3 Specimens.

8.14.3.1 A minimum of two specimens shall be tested.

8.14.3.2 One drop shall be conducted for each specimen.

8.14.4 Procedure.

8.14.4.1 Testing shall be conducted per ISO 22159, *Personal equipment for protection against falls — Descending devices*, Section 5.6, with the modifications specified in 8.14.4.1.1 through 8.14.4.1.4.

8.14.4.1.1 A force measurement device as described in ISO 22159, *Personal equipment for protection against falls — Descending devices*, Section 5.1.2, shall be installed between the test mass and the descent control device.

8.14.4.1.2 The entire test mass, consisting of the falling mass itself, the attachment device(s), and force-measuring device shall weigh 136 kg ± 1kg (300 lb ± 2.25 lb).

8.14.4.1.3 On a descent control device, the length of rope between the lowest point of the top anchor and the top entry point of the rope shall be 610 mm –0/+25 mm (24 in. –0/+1 in.).

8.14.4.1.4 The test mass shall be positioned to allow for a free fall of 153 mm –0/+13 mm (6 in. –0/+½ in.)

8.14.4.2 Following each drop, the device and the rope shall be visually examined for damage and functionality.

8.14.5 Report.

8.14.5.1 The maximum impact force shall be reported to the nearest 0.1 kN.

8.14.5.2 Any visible damage to the device or rope shall be reported.

8.14.5.3 Functionality of the device shall be reported.

8.14.6 Interpretation.

8.14.6.1 A recorded impact force in excess of 8.0 kN shall constitute failing performance.

8.14.6.2 Visible damage to device or rope shall constitute failing performance.

8.14.6.3 Failure of the device to function shall constitute failing performance.

8.14.6.4 One or more specimens failing the test shall constitute failing performance.

8.15 Elevated Temperature Rope Test.

8.15.1 Application.

8.15.1.1 This test shall apply to fire escape rope and fire escape webbing.

8.15.2 Samples. Samples shall be new and in unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8.15.3 Specimens.

8.15.3.1 Specimens shall be whole items.

8.15.3.2 A total of five specimens shall be tested.

8.15.4 Procedure.

8.15.4.1 Specimens shall be tested in a manner that allows a constant load to be applied to the rope throughout the duration of the test after stabilization. One end of the rope shall be

attached to a load cell, while the other shall be attached to an apparatus that allows constant load application.

8.15.4.2 Rope specimens shall be introduced into the high temperature furnace at the given set point ±5°C and the load stabilized within 5 seconds of introduction.

8.15.4.3 A thermocouple shall be attached to the rope at the location of the maximum temperature of the furnace (i.e., middle for horizontal furnace, top for vertical furnace). The exposure time begins when the thermocouple reading increases by 10 percent from room temperature and ends when the load cell reading drops to 0 upon failure of the rope.

8.15.5 Report. The time to failure shall be recorded from each test and the average and standard deviation calculated.

8.15.6 Interpretation.

8.15.6.1 Pass/fail performance shall be based on the average time to failure.

8.15.6.2 One or more specimens failing this test shall constitute a failing performance for the given rope type.

8.16 Flame Resistance Test.

8.16.1 Application.

8.16.1.1 This test method shall apply to flame-resistant life safety harness and belt webbing and materials.

8.16.1.2 Modifications to this test method for testing webbing shall be as specified in 8.16.8.

8.16.2 Samples. Samples shall consist of a 75 mm × 300 mm (3 in. × 12 in.) rectangle with the long dimension parallel to either the warp or filling, the wale or course, or the machine or cross-machine direction of the material.

8.16.3 Specimens. All specimens to be tested shall be conditioned as specified in 8.1.2.

8.16.4 Apparatus. The test apparatus specified in ASTM D 6413, *Standard Test Method for Flame Resistance of Textiles (Vertical Test)*, shall be used.

8.16.5 Procedure.

8.16.5.1 Flame-resistance testing shall be performed in accordance with ASTM D 6413, *Standard Test Method for Flame Resistance of Textiles (Vertical Test)*.

8.16.5.2 Each specimen shall be examined for evidence of melting or dripping.

8.16.6 Report.

8.16.6.1 Afterflame time and char length shall be recorded and reported for each specimen. The average afterflame time and char length for each material tested shall be calculated, reported, and recorded. The afterflame time shall be recorded and reported to the nearest 0.2 second and the char length to the nearest 3 mm (⅛ in.).

8.16.6.2 Observations of melting or dripping for each specimen shall be recorded and reported.

8.16.7 Interpretation. Pass or fail performance shall be based on any observed melting or dripping, the average afterflame time, and the average char length.

8.16.8 Specific Requirements for Testing Fire Escape Webbing.

8.16.8.1 Five specimens of the webbing material shall be tested.

8.16.8.2 Webbing shall be at least 305 mm (12 in.) in length by the widest width of the webbing.

8.16.8.3 Testing shall be performed in only one direction.

8.16.8.4 Testing shall be performed as specified in 8.16.2 through 8.16.7.

8.17 Heat Resistance Test.

8.17.1 Application.

8.17.1.1 This test method shall apply to flame-resistant life safety harness and belt webbing, materials, labels, and hardware.

8.17.1.2 Modifications to this test method for testing webbing shall be as specified in 8.16.8.

8.17.2 Samples. All samples shall be conditioned as specified in 8.1.2.

8.17.3 Specimens.

8.17.3.1 Heat resistance testing shall be conducted on a minimum of three specimens for each item.

8.17.4 Apparatus. The test oven shall be as specified in ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven.* Testing shall be carried out at a temperature of 260°C +6/−0°C (500°F +10/−0°F).

8.17.5 Procedure.

8.17.5.1 The specimen shall be suspended by metal hooks at the top and centered in the oven so that the entire specimen is not less than 50 mm (2 in.) from any oven surface or other specimen and air is parallel to the plane of the material.

8.17.5.2 The oven door shall not remain open more than 15 seconds. The air circulation shall be shut off while the door is open and turned on when the door is closed. The total oven recovery time after the door is closed shall not exceed 30 seconds.

8.17.5.3 The specimen mounted as specified, shall be exposed in the test oven for 5 minutes +0.15/−0 minute. The test exposure time shall begin when the test thermocouple recovers to a temperature of 260°C +6°/−0°C (500°F, +10°/−0°F).

8.17.5.4 Immediately after the specified exposure, the specimen shall be removed and examined for evidence of ignition, melting, dripping, or separation.

8.17.6 Report. Observations of ignition, melting, dripping, or separation shall be recorded and reported for each specimen.

8.17.7 Interpretation. Where applicable, any evidence of ignition, melting, dripping, or separation on any specimen shall constitute failing performance.

8.17.8 Specific Requirements for Testing Webbing.

8.17.8.1 Samples for conditioning shall include specimens at least 380 mm (15 in.) in length.

8.17.8.2 Testing shall be performed as specified in 8.17.2 through 8.17.7.

8.17.9 Specific Requirements for Testing Label Materials.

8.17.9.1 Where attached to textile material, samples for conditioning shall include specimens attached to the textile layer as used in the harness or belt positioned no closer than 50 mm (2 in.) apart in parallel strips. The textile material shall be at

least 1 m (1 yd) square of the textile layer on which the specimens are attached.

8.17.9.2 Where attached to webbing, samples for conditioning shall include specimens attached to the webbing as used in the harness or belt positioned no closer than 50 mm (2 in.) apart. The webbing shall be at least 380 mm (15 in.) in length.

8.17.9.3 Testing shall be performed as specified in 8.17.2 through 8.17.7.

8.17.10 Specific Requirements for Testing Hardware.

8.17.10.1 A minimum of three complete hardware items shall be tested.

8.17.10.2 Observations of hardware condition following heat exposure shall be limited to ignition.

8.17.10.3 Hardware shall be evaluated for functionality within 10 minutes following removal from the oven.

8.17.10.4 Testing shall be performed as specified in 8.17.2 through 8.17.7.

8.17.11 Specific Requirements for Testing Other Materials.

8.17.11.1 Samples for conditioning shall be at least 1 m (1 yd) square of each material.

8.17.11.2 Each specimen shall be 380 mm × 380 mm ± 13 mm (15 in. × 15 in. ± ½ in.) and shall be cut from the fabric to be utilized in the construction of the item.

8.17.11.3 Testing shall be performed as specified in 8.17.2 through 8.17.7.

8.18 Thread Heat Resistance Test.

8.18.1 Application. This test method shall apply to each type of sewing thread used in the construction of flame-resistant life safety harnesses and belts.

8.18.2 Samples. Samples for conditioning shall be lengths of thread 150 mm (6 in.) or greater.

8.18.3 Specimens.

8.18.3.1 A total of three different specimens of each thread type shall be tested.

8.18.3.2 All specimens shall be conditioned as specified in 8.1.2 prior to testing.

8.18.4 Apparatus.

8.18.4.1 An electrically heated stage having a circular depression large enough to insert a micro-cover glass shall be used. The stage shall have a variable transformer controlling the rate of heat input into the stage.

8.18.4.2 The following equipment shall also be used:

(1) Armored stem thermometer with a range of 150°C to 300°C accurate to 1°C
(2) Low-powered magnifying glass
(3) Two micro-cover glasses
(4) Spatula, pick needle, or other instrument for applying pressure to the micro-cover glasses
(5) Soxhlet extraction apparatus

8.18.4.3 The following reagents shall be used:

(1) Chloroform, USP
(2) U.S. Pharmacopoeia reference standards for melting point or other pure materials for calibrating the apparatus

8.18.5 Procedure.

8.18.5.1 The specimen shall be extracted with chloroform for a minimum of 20 extractions in a Soxhlet extractor and dried. The specimen shall then be cut into lengths of 2 mm (1/16 in.) or less.

8.18.5.2 The apparatus shall be calibrated by determining the melting point of a pure material of known melting point. The melting point of the pure material shall be in the range of the melting point of the fiber being tested. The value obtained shall agree within +1°C of the known value.

8.18.5.3 If the approximate melting point of the specimen is not known before testing, it shall be determined by a trial run.

8.18.5.4 In subsequent determinations immediately following the trial run or initial determination, the stage in each case shall be cooled to approximately 50°C below the expected melting point before the specimen is placed for testing.

8.18.5.5 The specimen shall be placed in a small mound on a cover glass and covered with another cover glass. The two cover glasses shall be pressed together gently but firmly, and placed in the circular depression on the stage. The temperature of the stage shall be raised with some rapidity to within 15°C of the expected melting point, and thereafter at a rate of 3°C to 4°C per minute. At this rate of temperature rise, a slight pressure shall be applied on the upper glass cover by pressing with a spatula, pick needle, or other instrument so that the complete fiber is in contact with the cover glass.

8.18.5.6 The specimen shall be observed with the aid of a magnifying glass, and the melting point taken as the temperature at which flow of the specimen is observed. At the observed melting point, the temperature shall be read to the nearest °C (°F).

8.18.6 Report.

8.18.6.1 The melting point of the sample unit shall be the average of the results obtained from the specimens tested and shall be recorded and reported to the nearest °C (°F).

8.18.6.2 The pass/fail results for each specimen tested shall be recorded and reported.

8.18.7 Interpretation. One or more thread specimens failing this test shall constitute failing performance for the thread type.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.1.6 This standard includes requirements for fall prevention rope and equipment for emergency services during rescue, fire fighting, and other emergency operations, or during training. It does not include requirements for fall protection for employees working at height in general industry or the construction and demolition industry.

A.1.2.1 Rescue operations are hazardous activities. It is the responsibility of the fire department to obtain expert instruction and to take adequate safety precautions based upon manufacturers' recommendations. Training should include use techniques and maintenance procedures — including properties of life safety rope, escape rope, water rescue throwline, life safety harnesses, belts, manufacturer-supplied eye terminations, moderate elongation laid life safety rope, belay devices, and auxiliary equipment — and deployment techniques of this equipment.

A.1.3.4 Fall factors *(as illustrated in Figure A.1.3.4)* are calculated by dividing the distance the person attached to the rope will fall by the length of the rope between the person and the rope anchor or belay. Thus, a 305 mm (1 ft) fall on a 150 mm (½ ft) rope would be a fall factor of 2.0; a 305 mm (1 ft) fall on a 305 mm (1 ft) rope would be a 1.0 fall factor; a 305 mm (1 ft) fall on a 1.12 m (4 ft) rope would be a 0.25 fall factor; and a 305 mm (1 ft) fall on a 12.2 m (40 ft) rope would be a 0.025 fall factor. Note as well that a 7.6 m (25 ft) fall on a 30.5 m (100 ft) rope is also a 0.25 fall factor. This formula assumes the fall takes place in free air without rope drag across building edges or through intermediate equipment.

When fall factors of greater than 0.25 are anticipated, such as are possible in lead climbing, dynamic ropes specifically designed for climbing should be considered. Only ropes certified to an appropriate climbing rope standard (i.e., UIAA, CE, etc.) are appropriate for this use. Dynamic climbing ropes should be stored, maintained, inspected, and use-logged in a manner similar to that required for static/low-stretch rope. Such operations are outside the scope of this document. A fall factor of 0.25 is the maximum considered for NFPA 1983.

Recent testing indicates that the formula for calculating fall factors may not translate perfectly from dynamic ropes to the more static design ropes used for fire service operations.

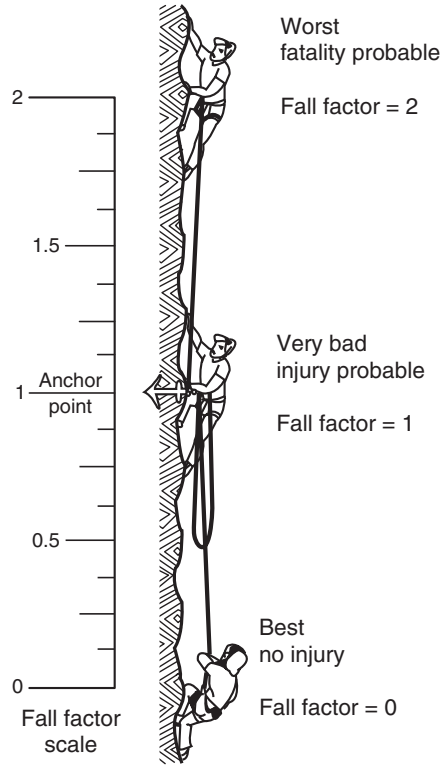


FIGURE A.1.3.4 Fall Factor.

A.3.2.1 Approved. 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 that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, 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.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations 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.

A.3.3.3.1 Load-Bearing Attachment Point. Load bearing attachment points are D-rings, loops, or other connection points on a life safety harness and escape belts that are designated for use as the connection point to suspend the full weight of the wearer and equipment such as when ascending or descending rope and for fall arrest when the wearer may fall and shock load the connection point. These attachment points are designed to withstand the forces generated in a fall arrest situation.

A.3.3.3.2 Positioning Attachment Point. Positioning attachment points are D-rings, loops, or other connection points on a life safety harness or belt that are designated for use solely to support the wearer's weight when connected to an anchor system. Attachment to positioning points can expose the wearer to a fall such as when using a strap connected to side D-rings when connected to a pole or tower. In other situations such as working on rappel, a fall can be much less likely. These attachment points are typically not designed to withstand the forces generated in a fall arrest situation, but can be designed for a much lower-impact fall. If the situation requires the use of fall arrest equipment, the anchor system should be attached to the main attachment point. Manufacturers should clearly identify and the user should be familiar with any attachment points that are only rated as positioning points.

A.3.3.7.1 Escape Belt. The intended use of the escape belt is to provide emergency escape capability to a fire fighter from an immediate life-threatening emergency above the ground floor of a structure. Escape belts do not have leg loops to prevent the belt from rising up the torso of the user. The fire fighter using an escape belt should always be able to maintain foot contact with the surface of the structure during descent or use a life safety harness.