

NFPA 1851

Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles

2001 Edition



NFPA, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 1851

Standard on

Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles

2001 Edition

This edition of NFPA 1851, *Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles*, was prepared by the Technical Committee on Structural Fire Fighting Protective Clothing and Equipment, released by the Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment, and acted on by the National Fire Protection Association, Inc., at its November Meeting held November 12–15, 2000, in Orlando, FL. It was issued by the Standards Council on January 13, 2001, with an effective date of February 9, 2001.

This edition of NFPA 1851 was approved as an American National Standard on February 9, 2001.

Origin and Development of NFPA 1851

This first edition of NFPA 1851 was developed to be a companion document for NFPA 1971, *Standard on Protective Ensemble for Structural Fire Fighting*. NFPA 1971, which has been in effect since 1975, is a document that specifies product design, performance, testing, and certification. NFPA 1971 is written for use by manufacturers to design and produce their products and by certification organizations to evaluate and test these products to determine compliance with the standard as well as to provide continuing checks on production to assure the continuing compliance of the product. While NFPA 1971 is primarily written for these groups, the standard is also used by fire departments and other organizations in developing purchase specifications for structural fire fighting protective ensembles and ensemble elements to assure that the products they will purchase are certified as being compliant with the standard.

NFPA 1851 is written for the organizations that evaluate the risks their emergency responders face and their particular needs for the protective clothing, develop purchase specifications, and purchase structural fire fighting protective ensembles and ensemble elements. It is also written for end users of structural fire fighting protective ensembles and ensemble elements to be able to inspect, maintain, and care for the protective ensembles and elements they use during structural fire fighting operations.

The overall protection and safety of fire fighting personnel is not only dependent on adequate protective clothing, but is equally dependent on the organization's policies, training, and administration of the correct use of the proper protective clothing in fire fighting situations. To satisfy the portion of the organization's overall protective clothing and equipment program that addresses structural fire fighting protective clothing, this document will provide criteria, for the organization and for the users, regarding necessary selection, care, and maintenance of the protective ensemble and ensemble elements.

In this standard, the requirements for several areas are written to begin with the actual person that uses the protective clothing being constantly aware of the protective clothing's condition and need for cleaning, repair, or more in-depth inspection. Users can perform the actions that they can easily undertake to improve the condition of the protective clothing. The more involved actions of advanced inspection, evaluation, cleaning, decontamination, and repair are forwarded on to the organization's designated staff who are trained and authorized to perform more advanced duties. In other areas, the requirements are written for the organization to perform the administrative functions of the program, and also perform periodic actions to evaluate the structural fire fighting protective clothing program to assure the program is achieving its goals and that the quality of the protective ensembles and ensemble elements provides optimum safety to the fire fighters to whom the protective clothing is issued.

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

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CA [RT]
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NC [RT]

Alternates

Janice C. Bradley, Industrial Safety Equipment Assn.,
VA [M]
(Alt. to D. W. Browner)
Robert H. Chiostergi, Southern Mills Inc., GA [M]
(Alt. to T. Hock (Vogelpohl))
Nicholas J. Curtis, Lion Apparel, Inc., OH [M]
(Alt. to F. P. Taylor)
Patricia A. Freeman, Globe Mfg. Co., NH [M]
(Alt. to R. A. Freese)

Patricia A. Gleason, Safety Equipment Inst., VA [RT]
(Alt. to T. G. Augherton)
Mary I. Grilliot, TFG/Morning Pride Mfg. L.L.C., OH [M]
(Alt. to B. Grilliot)
Steven B. Lumry, Oklahoma City Fire Dept., OK [C]
(Alt. to J. Minx)
Bob Montgomery, Celanese Corp., NC [M]
(Alt. to C. L. Harris)
Daniel P. Ryan, Underwriters Laboratories Inc., NC [RT]
(Alt. to T. L. Wollan)

Nonvoting

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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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Dean William Cox, Fairfax Fire & Rescue Dept., VA [U]
L. Charles Davis, Division of Fire and Emergency Services, KY [U]
Don R. Forrest, United Firefighters of Los Angeles City, CA [L]
Mary I. Grilliot, TFG/Morning Pride Mfg. L.L.C., OH [M]
Cliff Haskell, IAFF Local 522, CA [L]
Rep. Int'l Assn. of Fire Fighters
Larry Horn, City of Portland, OR [U]
Stephen J. King, New York City Fire Dept., NY [U]

James R. Lawson, U.S. Nat'l Inst. of Standards and Technology, MD [RT]
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William T. McCutcheon, Jr., Cairns & Brother, Inc., NJ [M]
Kevin J. O'Connell, Louisville Division of Fire, KY [U]
Tom Ragan, Shelby Specialty Gloves, TN [M]
Kevin M. Roche, Phoenix Fire Dept., AZ [U]
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Dennis K. Stout, E. D. Bullard Co., KY [M]
Karen E. Strumlock, Intertek Testing Services, NY [RT]
Jeffrey O. Stull, Int'l Personnel Protection, Inc., TX [SE]
Robert D. Tutterow, Jr., Charlotte Fire Dept., NC [E]
Rep. Int'l Assn. of Fire Chiefs
Woody Walters, MN State Fire/EMS/Safety Center, MN [C]
Rep. Nat'l Volunteer Fire Council
Harry Winer, U.S. Navy, MA [RT]
Thomas L. Wollan, Underwriters Laboratories Inc., NC [RT]

Alternates

Roger L. Barker, N. Carolina State University, NC [M]
(Alt. to P. A. Freeman)
Tim Durby, City of Phoenix, AZ [U]
(Alt. to K. M. Roche)
Kerry W. Gordon, Cairns & Brother, Inc., NJ [M]
(Alt. to W. T. McCutcheon, Jr.)
Bill Grilliot, TFG/Morning Pride Mfg. L.L.C., OH [M]
(Alt. to M. I. Grilliot)
James S. Johnson, Lawrence Livermore Nat'l Lab, CA [RT]
(Alt. to D. G. Beason)
Kevin S. Malley, New York City Fire Dept., NY [U]
(Alt. to S. J. King)
James W. Marquardt, Underwriters Laboratories Inc., IL [RT]
(Alt. to T. L. Wollan)

Richard A. Oleson, E. D. Bullard Co., KY [M]
(Alt. to D. K. Stout)
Willie "Mitch" Parish, Indiana Dept. of Transportation, IN [C]
(Alt. to W. Walters)
Kelly Sisson, City of La Mesa Fire Dept., CA [U]
(Alt. to M. Carlin)
Charles C. Soros, Spencer Safety Products Co., WA [SE]
(Alt. to J. O. Stull)
Frank P. Taylor, Lion Apparel Inc., OH [M]
(Alt. to D. Aldridge)
Robert Vettori, U.S. Nat'l Inst. of Standards and Technology, MD [RT]
(Alt. to J. R. Lawson)

Nonvoting

Glen E. Gardner, U.S. Occupational Safety & Health Admin., DC [E]

Bruce W. Teele, NFPA Staff Liaison

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on 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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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 9 and Appendix B.

Chapter 1 Administration

1.1 Scope.

1.1.1 This standard shall specify the minimum selection, care, and maintenance requirements for structural fire fighting protective ensembles, and the individual ensemble elements that include coats, trousers, coveralls, helmets, gloves, footwear, and interface components that are compliant with NFPA 1971, *Standard on Protective Ensemble for Structural Fire Fighting*.

1.1.2 This standard shall also apply to structural fire fighting protective clothing and equipment certified as compliant to previous editions of NFPA 1971, *Standard on Protective Clothing for Structural Fire Fighting*; NFPA 1972, *Standard on Helmets for Structural Fire Fighting*; NFPA 1973, *Standard on Gloves for Structural Fire Fighting*; and NFPA 1974, *Standard on Protective Footwear for Structural Fire Fighting*.

1.1.3 This standard shall not apply to other organizational programs such as structural fire fighting protective ensembles for training, appropriate use of structural fire fighting protective ensembles for operations, and infection control, as these programs are under the jurisdiction of other NFPA standards.

1.1.4 This standard shall not apply to respiratory protective equipment or personal alert safety systems.

1.1.5 This standard shall not apply to protective ensembles or protective clothing that are compliant with NFPA 1976, *Standard on Protective Ensembles for Proximity Fire Fighting*; NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*; NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*; NFPA 1992, *Standard on Liquid Splash-Protective Ensembles and Protective Clothing for Hazardous Materials Emergencies*; and NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*.

1.1.6 The requirements of this standard shall not apply to accessories that might be attached to any element of the structural fire fighting protective ensemble unless specifically addressed herein.

1.1.7 Nothing herein shall restrict any jurisdiction from exceeding these minimum requirements.

1.2 Purpose.

1.2.1 The purpose of this standard shall be to establish a program for structural fire fighting protective ensembles and ensemble elements to reduce the safety risks and potential health risks associated with poorly maintained, contaminated,

or damaged structural fire fighting protective ensembles and ensemble elements.

1.2.2 This standard shall also establish a basic criteria for evaluating, selecting, and purchasing personal protective clothing and equipment.

1.3 Definitions.

1.3.1 Accessories. Those items that are attached to an ensemble or ensemble element but designed in such a manner to be removable from the ensemble or the element and that are not necessary to meet the requirements of the standard. Such accessories include, but are not limited to, utility belts, harnesses, backpacks, tools, tool packs, radios, radio packs, suspenders, lights, and heat sensing devices.

1.3.2 Advanced Cleaning. See 1.3.9.1.

1.3.3 Biological Agents. Biological materials that could be capable of causing a disease or long-term damage to the human body.

1.3.4 Body Fluids. Fluids produced by the body including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluids, cerebrospinal fluid, synovial fluid, and pericardial fluid.

1.3.5* Carcinogen/Carcinogenic. A cancer-causing substance which is identified in one of several published lists.

1.3.6 Care. Procedures for cleaning, decontamination, and storage of protective clothing and equipment.

1.3.7 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 a specific standard(s), authorizes the manufacturer to use a label on listed products that comply with the requirements of that standard(s), 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 that standard(s).

1.3.8 Char. The formation of a brittle residue when material is exposed to thermal energy.

1.3.9* Cleaning. The act of removing soils and contaminants from ensembles and elements by mechanical, chemical, thermal or combined processes.

1.3.9.1* Advanced Cleaning. The thorough cleaning of ensembles or elements by washing with cleaning agents.

1.3.9.2 Contract Cleaning. Cleaning conducted by a facility outside the organization that specializes in cleaning protective clothing.

1.3.9.3* Routine Cleaning. The light cleaning of ensembles or elements performed by the end user without taking the elements out of service.

1.3.9.4* Specialized Cleaning. Cleaning to remove hazardous materials or biological agents.

1.3.10 Coat. A protective garment; an element of the protective ensemble designed to provide minimum protection to upper torso and arms, excluding the hands and head.

1.3.11 Contamination/Contaminated. The process by which ensembles and ensemble elements are exposed to hazardous materials or biological agents.

1.3.12 Coverall. A protective garment; an element of the protective ensemble configured as a single-piece garment and designed to provide minimum protection to the torso, arms, and legs, excluding the head, hands, and feet.

1.3.13 Craze. The appearance of fine cracks in surface of helmet shell or other smooth surface of an element.

1.3.14 Cross Contamination. The transfer of contamination from one item to another or to the environment.

1.3.15 Crown. The portion of the helmet that covers the head above the reference plane.

1.3.16 Crown Straps. A helmet term for the part of the suspension that passes over the head.

1.3.17 Decontamination. The act of removing contaminants from ensembles and ensemble elements by a physical, chemical, or combined process. (*See also 1.3.9, Cleaning, and 1.3.9.3, Specialized Cleaning.*)

1.3.18 Disinfectant. An agent that destroys, neutralizes, or inhibits the growth of harmful biological agents.

1.3.19 Ear Covers. An integral part of the helmet designed to provide limited protection for the ears. Provides no significant thermal protection.

1.3.20 Elasticity. The ability of an ensemble or element, when repeatedly stretched, to return to its original form as applied to wristlets and hoods.

1.3.21 Elements. The parts or items that comprise the protective ensemble. The protective ensemble elements are coats, trousers, coveralls, helmets, gloves, footwear, and interface components.

1.3.22 Embrittlement. The hardening of a textile material that makes the ensemble or element or a textile material susceptible to easy fracture.

1.3.23 Emergency Medical Operations. The delivery of emergency medical care and transportation prior to arrival at a hospital or other health care facility.

1.3.24 Energy Absorbing System. A material, suspension system, or combination thereof incorporated into the design of the helmet to attenuate impact energy.

1.3.25 Ensemble. Multiple elements of clothing and equipment designed to provide a degree of protection for fire fighters from adverse exposures to the inherent risks of structural fire fighting operations and certain other emergency operations. The elements of the protective ensemble are coats, trousers, coveralls, helmets, gloves, footwear, and interface components.

1.3.26 Faceshield. A helmet component intended to help protect a portion of the wearer's face in addition to the eyes, not intended as primary eye protection.

1.3.27 Field test. The non-laboratory evaluation of one or more protective ensemble elements used to determine product performance related to organizational expectations or to compare products in a manner related to their intended use.

1.3.28 Fit. The quality, state or manner in which the length and closeness of clothing, when worn, relates to the human body.

1.3.29 Flame Resistance/Resistant. The property of a material whereby the application of a flaming or nonflaming

source of ignition and the subsequent removal of the ignition source results in the termination of combustion. Flame resistance can be an inherent property of the material, or it can be imparted by specific treatment.

1.3.30 Footwear. An element of the protective ensemble designed to provide minimum protection to the foot, ankle, and lower leg.

1.3.31 Functional/Functionality. The ability of an ensemble or element or component to continue to be utilized for its intended purpose.

1.3.32 Garment(s). The coat, trouser, or coverall elements of the protective ensemble designed to provide minimum protection to the upper and lower torso, arms, and legs, excluding the head, hands, and feet.

1.3.33 Gauntlet. The circular, flared, or otherwise expanded part of the glove that extends beyond the opening of the glove body.

1.3.34 Gloves. An element of the protective ensemble designed to provide minimum protection to the fingers, thumb, hand, and wrist.

1.3.35 Glove Wristlet. The circular, close-fitting part of the glove, usually made of knitted material, that extends beyond the opening of the glove body.

1.3.36 Goggles. A helmet component intended to help protect the wearer's eyes and a portion of the wearer's face, not intended as primary eye protection.

1.3.37 Hardware. Nonfabric components of the structural fire fighting protective ensemble including, but not limited to, those made of metal or plastic.

1.3.38 Hazardous Materials. Any solid, liquid, gas, or mixture thereof that can potentially cause harm to the human body through respiration, ingestion, skin absorption, injection, or contact.

1.3.39 Hazardous Materials Emergencies. Incidents involving the release or potential release of hazardous chemicals into the environment that can cause loss of life, personnel injury, or damage to property and the environment.

1.3.40 Helmet. An element of the protective ensemble designed to provide minimum protection to the head.

1.3.41 Hood. The interface component element of the protective ensemble designed to provide limited protection to the coat/helmet/SCBA facepiece interface area.

1.3.42 Integrity. The ability of a ensemble or element to remain intact and provide continued minimum performance.

1.3.43 Interface Area. An area of the body where the protective garments, helmet, gloves, footwear, or SCBA facepiece meet (i.e., the protective coat/helmet/SCBA facepiece area, protective coat/protective trouser area, the protective coat/glove area, and the protective trouser/footwear area).

1.3.44 Liner System. The combination of the moisture barrier and thermal barrier as used in a garment.

1.3.45 Maintenance. Procedures for inspection, repair, and retirement of protective clothing and equipment.

1.3.46 Manufacturer. The entity that assumes the liability and provides the warranty for the compliant product.