

NFPA® 1851

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

2014 Edition



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An International Codes and Standards Organization

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Standard on

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

2014 Edition

This edition of NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, was prepared by the Technical Committee on Structural and Proximity 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 NFPA at its June Association Technical Meeting held June 10–13, 2013, in Chicago, IL. It was issued by the Standards Council on July 26, 2013, with an effective date of August 15, 2013, and supersedes all previous editions.

This edition of NFPA 1851 was approved as an American National Standard on August 15, 2013.

Origin and Development of NFPA 1851

The first edition of NFPA 1851, in 2001, was titled *Standard on the Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles*, and was developed to be a companion document for NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting*. NFPA 1971, which has been in effect since 1975, 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 those products to determine compliance with the standard as well as to provide checks on production to ensure continuing compliance. While NFPA 1971 is primarily written for those 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 ensure that the products they 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, that develop purchase specifications, and that 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 depend not only on adequate protective clothing but equally on the organization's policies, training, and administration of the correct use of the proper protective ensembles in fire fighting situations. To satisfy the portion of the organization's overall protective clothing and equipment program that addresses structural fire fighting protective ensembles, this document provides criteria for the 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 person who actually uses the protective ensemble being constantly aware of the protective ensemble's condition and need for cleaning, repair, or more in-depth inspection. Users can perform the simple actions to improve the condition of the protective ensemble. The more involved actions of advanced inspection, evaluation, cleaning, decontamination, and repair are handled by 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 periodic actions to evaluate the structural fire fighting protective ensemble program to ensure that the program is achieving its goals and that the quality of the protective ensembles and ensemble elements provides optimum safety to fire fighters.

The second edition of NFPA 1851 was a complete revision of the first edition. Because NFPA 1976, *Standard on Protective Ensemble for Proximity Fire Fighting*, was incorporated into the

2007 edition of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, under the Technical Committee on Structural and Proximity Fire Fighting Protective Clothing and Equipment, NFPA 1851 was expanded to include both structural fire fighting ensembles and proximity fire fighting ensembles.

The complete revision followed the new standards format according to the *Manual of Style for NFPA Technical Committee Documents*, which has Chapter 1 covering scope, purpose, and application; Chapter 2 covering referenced publications; and Chapter 3 covering definitions. Chapter 4 covered the organization's program; Chapter 5, selection; Chapter 6, inspections; Chapter 7, cleaning and decontamination; Chapter 8, repairs; Chapter 9, storage; Chapter 10, retirement, disposition, and special incident procedures; Chapter 11, new requirements for independent service providers (ISPs); and Chapter 12, testing procedures.

New requirements in Chapter 11 for organizations and ISPs and for verification of the ISPs by independent, third-party certification organizations set the criteria for organizations and ISPs to perform the tasks of inspection, cleaning, and repairing of protective ensembles and ensemble elements. New requirements for testing methods for trained personnel in the organization as well as the ISPs set the criteria to determine the functionality and protection afforded by the ensembles and ensemble elements.

Requirements were revised in Chapter 10 for retiring structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements to require retirement not later than 10 years from the date the ensembles or ensemble elements were manufactured. The radiant reflective outer shell of proximity fire fighting ensembles and ensemble elements must be replaced a maximum of 5 years from the date the ensembles or ensemble elements were manufactured. More frequent replacement of fire fighting ensembles and ensemble elements was now required to better ensure that fire fighters have state-of-the-art protection from fire fighting environments. The significant changes that the technology undergoes within two editions of this standard (approximately 10 years), in addition to the normal "wear and tear" of fire fighting, other emergency incident responses, training, and other factors, dictate that protective ensembles and ensemble elements be replaced. Fire departments that respond to a higher-than-average number of emergency incidents or that have frequent or extensive "working fire" operations might want to plan for replacement of ensembles or ensemble elements on a more frequent cycle.

This third edition of NFPA 1851 is a complete revision and features many editorial changes as well as new definitions for *manufacturer trained organization*, *verified organization*, and *verified independent service provider (ISP)*. A new table has been added to Chapter 4 that specifies the responsibilities for garment inspection, cleaning, and repair. Chapter 6, Inspection, now includes inspection for delamination and label integrity and legibility. Chapter 7 has changes to the cleaning and decontamination procedure, and Chapter 8 has revised requirements for the repair of ensemble and ensemble elements. There are also several changes to Chapter 11, Verification, that affect how an organization or ISP is to be verified, and two new tables have been added that address advanced inspection and advanced cleaning evaluations.

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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 protective ensembles, except respiratory protection, that provides head, limb, hand, foot, torso, and interface protection for fire fighters and other emergency services responders during incidents involving structural fire fighting operations or proximity fire fighting operations.

Structural fire fighting operations include the activities of rescue, fire suppression, and property conservation during incidents involving fires in buildings, enclosed structures, vehicles, marine vessels, or like properties.

Proximity fire fighting operations include the activities of rescue, fire suppression, and property conservation during incidents involving commercial and military aircraft fires, bulk flammable gas fires, bulk flammable and combustible liquids fires, combustible metal fires, exotic fuel fires, and other such fires that produce very high levels of radiant heat as well as convective and conductive heat.

Additionally, this committee shall have primary responsibility for documents on the selection, care, and maintenance of structural and proximity fire fighting protective ensembles by fire and emergency services organizations and personnel.

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Fighting and Proximity Fire Fighting**

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Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

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 the minimum selection, care, and maintenance requirements for structural fire fighting protective ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components that are compliant with NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

1.1.2 This standard shall also specify the minimum selection, care, and maintenance requirements for proximity fire fighting protective ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components that are compliant with NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

1.1.3 This standard shall also specify requirements for both structural fire fighting and proximity fire fighting protective ensembles, ensemble elements, clothing, and equipment certified as compliant with previous editions of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*; NFPA 1972, *Standard on Helmets for Structural Fire Fighting*; NFPA 1973, *Standard on Gloves for Structural Fire Fighting*; NFPA 1974, *Standard on Protective Footwear for Structural Fire Fighting*; or NFPA 1976, *Standard on Protective Ensembles for Proximity Fire Fighting*.

1.1.4 This standard shall also specify the minimum selection, care, and maintenance requirements for structural fire fighting protective ensembles with optional CBRN protection and

for proximity fire fighting protective ensembles with optional CBRN protection.

1.1.5 This standard shall not specify requirements for other organizational programs such as appropriate use of structural fire fighting or proximity fire fighting protective ensembles for training, for operations, or for infection control, because these programs are under the jurisdiction of other NFPA standards.

1.1.6 This standard shall not apply to protective ensembles or protective clothing that are compliant with NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*; 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 Clothing for Hazardous Materials Emergencies*; NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*; and NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*.

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

1.1.8 This standard shall not be construed as addressing all the safety concerns, if any, associated with the use of this standard by testing or repair facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of protective ensembles or ensemble elements to establish safety and health practices and to 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 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 and for proximity fire fighting protective ensembles and ensemble elements to reduce the safety risks and potential health risks associated with poorly maintained, contaminated, or damaged protective ensembles and ensemble elements.

1.2.2 The purpose of this standard shall also be to establish basic criteria for selection, inspection, cleaning, decontamination, repair, storage, and retirement of structural fire fighting protective ensembles or ensemble elements and proximity fire fighting protective ensembles or ensemble elements.

1.3 Application.

1.3.1 This standard shall apply to structural fire fighting and proximity fire fighting ensembles and ensemble elements certified as compliant with NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

1.3.2 This standard shall also apply to structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements certified as compliant with the previous editions of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, or

NFPA 1976, *Standard on Protective Ensembles for Proximity Fire Fighting*, and to protective clothing and equipment certified as compliant with previous editions of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity 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*.

1.3.2.1 This standard shall also apply to structural fire fighting protective ensembles with optional CBRN protection and to proximity fire fighting protective ensembles with optional CBRN protection.

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

1.3.4 This standard shall not apply to respiratory protective equipment other than where such equipment interfaces with structural fire fighting protective ensembles with optional CBRN protection.

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

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 because 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 Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 600, *Standard on Industrial Fire Brigades*, 2010 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, 2013 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2013 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2013 edition.

NFPA 1972, *Standard on Helmets for Structural Fire Fighting*, 1992 edition.

NFPA 1973, *Standard on Gloves for Structural Fire Fighting*, 1993 edition.

NFPA 1974, *Standard on Protective Ensembles for Proximity Fire Fighting*, 1992 edition.

NFPA 1976, *Standard on Protective Ensembles for Proximity Fire Fighting*, 2000 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, 2011 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*, 2005 edition.

NFPA 1992, *Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2012 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*, 2012 edition.

NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations*, 2013 edition.

2.3 Other Publications.

2.3.1 ACGIH Publications. American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH 45240.

ACGIH Publication No. 0107, *2007 TLVs and BEIs*.

2.3.2 ISO Publications. International Organization for Standardization, ISO Central Secretariat 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Genève 20, Switzerland.

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

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

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

2.3.3 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402-9325.

NIOSH Publication No. 2005-149, *NIOSH Pocket Guide to Chemical Hazards*, September 2005.

2.3.4 Other Publications. Lewis, R., *Hazardous Chemicals Desk Reference*, John Wiley & Sons, New York, 2002.

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 requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *Manual of Style for NFPA Technical Committee Documents*.

3.3 General Definitions.

3.3.1 Accessory/Accessories. An item, or items, that could be attached to a certified product but that are not necessary for the certified product to meet the requirements of the standard.

3.3.2 Advanced Cleaning. See 3.3.13.1.

3.3.3 Biological Terrorism Agents. Liquid or particulate agents that can consist of a biologically derived toxin or pathogen to inflict lethal or incapacitating casualties.

3.3.4 Body Fluids. Fluids that are 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.

3.3.5 Carcinogen/Carcinogenic. A cancer-causing substance that is identified in one of several published lists, including, but not limited to, *NIOSH Pocket Guide to Chemical Hazards*, *Hazardous Chemicals Desk Reference*, and the *ACGIH 2007 TLVs and BEIs*.

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

3.3.7 CBRN. An abbreviation for chemicals, biological agents, and radiological particulate hazards. (See also 3.3.9, *CBRN Terrorism Agents*.)

3.3.8* CBRN Barrier Layer. The part of the composite that is intended to provide protection against CBRN terrorism agents.

3.3.9* CBRN Terrorism Agents. Chemicals, biological agents, and radiological particulates that could be released as the result of a terrorist attack. (See also 3.3.3, *Biological Terrorism Agents*; 3.3.12, *Chemical Terrorism Agents*; 3.3.78, *Radiological Particulate Terrorism Agents*; and 3.3.105, *Toxic Industrial Chemicals*.)

3.3.10 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 continued compliance of labeled and listed products with the requirements of that standard(s).

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

3.3.12 Chemical Terrorism Agents. Liquid, solid, gaseous, and vapor chemical warfare agents and toxic industrial chemicals used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack.

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

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

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

3.3.13.3* Specialized Cleaning. Cleaning to remove hazardous materials or body fluids.

3.3.14 Coat. See 3.3.91, Structural Fire Fighting Protective Coat, and 3.3.68, Proximity Fire Fighting Protective Coat.

3.3.15 Contamination/Contaminated. The process by which ensembles and ensemble elements are exposed to hazardous materials, body fluids, or CBRN terrorism agents.

3.3.16 Coverall. See 3.3.92, Structural Fire Fighting Protective Coverall, and 3.3.69, Proximity Fire Fighting Protective Coverall.

3.3.17 Craze. The appearance of fine cracks in the surface of a helmet shell or other smooth surface of an ensemble element.

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

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

3.3.20 Crown Straps. The part of the helmet suspension that passes over the head.

3.3.21 Decontamination. The act of removing contaminants from protective clothing and equipment by a physical, chemical, or combined process. (See also 3.3.13, *Cleaning*.)

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

3.3.23* Drag Rescue Device. A component integrated within the protective coat element to aid in the rescue of an incapacitated fire fighter.

3.3.24 DRD. See 3.3.23, Drag Rescue Device.

3.3.25 Ear Covers. An interface component of the protective helmet element that provides limited protection to the helmet/coat interface area.

3.3.26 Elasticity. The ability of a material to return to its original form after being stretched.

3.3.27 Elements. See 3.3.32, Ensemble Elements.

3.3.28 Embrittlement. The hardening of a material that makes it susceptible to easy fracture.

3.3.29* Emergency Medical Operations. Delivery of emergency patient care, including patient transportation, provided prior to arrival at a hospital or other health care facility.

3.3.30 Energy Absorbing System. Materials or systems used to attenuate impact energy.

3.3.31 Ensemble. See 3.3.93, Structural Fire Fighting Protective Ensemble, 3.3.70, and Proximity Fire Fighting Protective Ensemble.

3.3.32* Ensemble Elements. The compliant products that provide protection to the upper and lower torso, arms, legs, head, hands, and feet.

3.3.33 Faceshield. The component of the helmet that provides limited protection to a portion of the wearer's face. Not primary eye protection.

3.3.34 Field Evaluation. The nonlaboratory assessment of an ensemble, ensemble element, or item.

3.3.35 Fit. The quality, state, and manner in which clothing and equipment, when worn, relate to the human body.

3.3.36* Flame Resistance (Protective Clothing and Equipment). The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or nonflaming source of ignition, with or without subsequent removal of the ignition source. (See also 3.3.50, *Inherent Flame Resistance*.)

3.3.37 Footwear. See 3.3.95, Structural Fire Fighting Protective Footwear, and 3.3.72, Proximity Fire Fighting Protective Footwear.

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

3.3.39 Garment. See 3.3.96, Structural Fire Fighting Protective Garments, and 3.3.73, Proximity Fire Fighting Protective Garments.

3.3.40 Gauntlet. An interface component of the protective glove element that provides limited protection to the coat/glove interface area.

3.3.41 Glove. See 3.3.97, Structural Fire Fighting Protective Glove, and 3.3.74, Proximity Fire Fighting Protective Glove.

3.3.42 Glove Wristlet. See 3.3.114, Wristlet.

3.3.43* Goggles. Ensemble element or component that provides limited protection to the wearer's eyes. Goggles might or might not provide primary protection.

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

3.3.45* Hazardous Materials. Substances (solid, liquid, or gas) that when released are capable of creating harm to people, the environment, and property.

3.3.46 Hazardous Materials Emergencies. Incidents involving the release or potential release of hazardous materials.

3.3.47 Helmet. See 3.3.98, Structural Fire Fighting Protective Helmet, and 3.3.75, Proximity Fire Fighting Protective Helmet.

3.3.48 Hood. See 3.3.99, Structural Fire Fighting Protective Hood.

3.3.49 Independent Service Provider (ISP). See 3.3.110, Verified Independent Service Provider (ISP).

3.3.50 Inherent Flame Resistance. Flame resistance that is derived from the essential characteristics of the fiber or polymer.

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

3.3.52 Interface Area. An area of the body where the protective garments, helmet, gloves, footwear, or SCBA facepiece meet. Interface areas include, but are not limited to, the coat/helmet/SCBA facepiece area, the coat/trouser area, the coat/glove area, and the trouser/footwear area.

3.3.53* Interface Component(s). Any material, part, or subassembly used in the construction of the compliant product that provides limited protection to interface areas.

3.3.54 Liner System. The moisture barrier and thermal barrier components as used in a garment.

3.3.55 Maintenance. The inspection, service, and repair of protective clothing and equipment, including the determination for removal from service.

3.3.56 Major A Seam. See 3.3.81.1.

3.3.57 Major B Seam. See 3.3.81.2.

3.3.58 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.

3.3.59 Manufacturer-Trained Organization. See 3.3.63.1.

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

3.3.61 Minor Seam. See 3.3.81.3.

3.3.62 Moisture Barrier. The component of an ensemble element or item that principally prevents the transfer of liquids.

3.3.63* Organization. The entity that provides the direct management and supervision for the emergency services personnel.

3.3.63.1 Manufacturer-Trained Organization. A non-verified organization trained by an element manufacturer of the same element type to conduct any one or a combination of advanced cleaning, advanced inspection, and basic repair on the organization's elements.

3.3.63.2 Verified Organization. An organization verified by a third-party certification organization to conduct any one or a combination of advanced cleaning, advanced inspection, basic repair, and advanced repair on any organization's elements.

3.3.64 Outer Shell. The outermost component of an ensemble element or item, not including trim, hardware, reinforcing material, pockets, wristlet material, accessories, fittings, or suspension systems.

3.3.65 Protective Clothing. See 3.3.93, Structural Fire Fighting Protective Ensemble, and 3.3.70, Proximity Fire Fighting Protective Ensemble.



3.3.66 Protective Ensemble. See 3.3.93, Structural Fire Fighting Protective Ensemble, and 3.3.70, Proximity Fire Fighting Protective Ensemble.

3.3.67 Proximity Fire Fighting. Specialized fire fighting operations that can include the activities of rescue, fire suppression, and property conservation at incidents involving fires producing high levels of radiant heat as well as conductive and convective heat.

3.3.68 Proximity Fire Fighting Protective Coat. The element of the protective ensemble that provides protection to the upper torso and arms, excluding the hands and head.

3.3.69 Proximity Fire Fighting Protective Coverall. The element of the protective ensemble that provides protection to the torso, arms, and legs, excluding the head, hands, and feet.

3.3.70* Proximity Fire Fighting Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.

3.3.71 Proximity Fire Fighting Protective Ensemble with Optional CBRN Terrorism Agent Protection. A compliant proximity fire fighting protective ensemble that is also certified as an entire ensemble to meet the optional requirements for protection from specific CBRN terrorism agents.

3.3.72 Proximity Fire Fighting Protective Footwear. The element of the protective ensemble that provides protection to the foot, ankle, and lower leg.

3.3.73 Proximity Fire Fighting Protective Garments. The coat, trouser, and coverall elements of the protective ensemble.

3.3.74 Proximity Fire Fighting Protective Glove. The element of the protective ensemble that provides protection to the hand and wrist.

3.3.75 Proximity Fire Fighting Protective Helmet. The element of the protective ensemble that provides protection to the head.

3.3.76 Proximity Fire Fighting Protective Shroud. The component of the helmet that provides limited protection to the helmet/coat interface area.

3.3.77 Proximity Fire Fighting Protective Trouser. The element of the protective ensemble that provides protection to the lower torso and legs, excluding the ankles and feet.

3.3.78* Radiological Particulate Terrorism Agents. Particles that emit ionizing radiation in excess of normal background levels, used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of terrorist attack.

3.3.79 Retirement. The process of permanently removing an ensemble element from emergency operations service in the organization.

3.3.80 Routine Cleaning. See 3.3.13.2.

3.3.81 Seam. Any permanent attachment of two or more materials in a line formed by joining the separate material pieces.

3.3.81.1* Major A Seam. Outermost layer seam assemblies where rupture could reduce the protection of the garment by exposing the garment's inner layers.

3.3.81.2* Major B Seam. Inner layer seam assemblies where rupture could reduce the protection of the garment

by exposing the next layer of the garment, the wearer's station/work uniform, other clothing, or skin.

3.3.81.3 Minor Seam. Remaining seam assemblies that are not classified as Major A or Major B seams.

3.3.82 Selection. The process of determining what protective clothing and equipment (PCE) is necessary for protection of fire and emergency services response personnel from an anticipated specific hazard or other activity, the procurement of the appropriate PCE, and the choice of the proper PCE for a specific hazard or activity at an emergency incident.

3.3.83 Separate/Separation. A material response evidenced by splitting or delaminating.

3.3.84 Service Life. The period for which compliant product can be useful before retirement.

3.3.85 Shank. The component of footwear that provides additional support to the instep.

3.3.86 Shroud. See 3.3.76, Proximity Fire Fighting Protective Shroud.

3.3.87 Soiled/Soiling. The accumulation of materials that are not considered hazardous materials, body fluids, or CBRN terrorism agents but that could degrade the performance of the ensemble or ensemble element.

3.3.88 Specialized Cleaning. See 3.3.13.3.

3.3.89 Stress Area. Those areas of the garment that are subjected to more wear, including, but not limited to, crotches, knees, elbows, and shoulders.

3.3.90 Structural Fire Fighting. The activities of rescue, fire suppression, and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or emergency situation.

3.3.91 Structural Fire Fighting Protective Coat. The element of the protective ensemble that provides protection to the upper torso and arms, excluding the hands and head.

3.3.92 Structural Fire Fighting Protective Coverall. The element of the protective ensemble that provides protection to the torso, arms, and legs, excluding the head, hands, and feet.

3.3.93* Structural Fire Fighting Protective Ensemble. Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of emergency incident operations.

3.3.94 Structural Fire Fighting Protective Ensemble with Optional CBRN Terrorism Agent Protection. A compliant structural fire fighting protective ensemble that is also certified as an entire ensemble to meet the optional requirements for protection from specific CBRN terrorism agents.

3.3.95 Structural Fire Fighting Protective Footwear. The element of the protective ensemble that provides protection to the foot, ankle, and lower leg.

3.3.96 Structural Fire Fighting Protective Garments. The coat, trouser, and coverall elements of the protective ensemble.

3.3.97 Structural Fire Fighting Protective Glove. The element of the protective ensemble that provides protection to the hand and wrist.

3.3.98 Structural Fire Fighting Protective Helmet. The element of the protective ensemble that provides protection to the head.

3.3.99 Structural Fire Fighting Protective Hood. The interface element of the protective ensemble that provides limited protection to the coat/helmet/SCBA facepiece interface area.

3.3.100 Structural Fire Fighting Protective Trouser. The element of the protective ensemble that provides protection to the lower torso and legs, excluding the ankles and feet.

3.3.101 Suspension. The energy attenuating system of the helmet that is made up of the headband and crown strap.

3.3.102 Tensile Strength. The force at which a fiber or fabric will break when pulled in one dimension.

3.3.103 Textile Fabric. A planar structure consisting of yarns or fibers.

3.3.104 Thermal Barrier. The component of an ensemble element or item that principally provides thermal protection.

3.3.105 Toxic Industrial Chemicals. Highly toxic solid, liquid, or gaseous chemicals that have been identified as mass casualty threats that could be used to inflict casualties, generally on a civilian population, during a terrorist attack.

3.3.106 Trim. See 3.3.112, Visibility Markings.

3.3.107 Trouser. See 3.3.100, Structural Fire Fighting Protective Trousers, and 3.3.77, Proximity Fire Fighting Protective Trouser.

3.3.108* Universal Precautions. An approach to infection control in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

3.3.109 Utility Sink. A separate sink used for cleaning ensembles and ensemble elements.

3.3.110 Verified Independent Service Provider (ISP). An independent service provider verified by a third-party certification organization to conduct any one or a combination of advanced inspection, advanced cleaning, basic repair, or advanced repair service.

3.3.111 Verified Organization. See 3.3.63.2.

3.3.112 Visibility Markings. Retroreflective and fluorescent conspicuity enhancements. Retroreflective enhancements improve nighttime conspicuity, and fluorescent enhancements improve daytime conspicuity.

3.3.113 Winter Liner. An optional component layer that provides added insulation against cold.

3.3.114 Wristlet. The interface component of the protective element or item that provides limited protection to the coat/glove interface area.

fire fighting ensembles and ensemble elements that are suitable and appropriate for the intended use; maintaining such protective ensembles and ensemble elements in a safe, usable condition to provide the intended protection to the user; removing from use such protective ensembles and ensemble elements that could cause or contribute to user injury, illness, or death because of their condition; and reconditioning, repairing, or retiring such protective ensembles and ensemble elements.

4.1.3 Where this program for the selection, care, and maintenance of structural and proximity fire fighting protective ensembles and ensemble elements is part of an organization's overall program on protective clothing and protective equipment, the portion of the organization's overall program that affects structural and proximity fire fighting protective ensembles and ensemble elements shall be in accordance with Section 4.2.

4.2 Program Organization for Structural Fire Fighting Ensembles and Ensemble Elements and Proximity Fire Fighting Ensembles and Ensemble Elements.

4.2.1 The organization's program specified in Section 4.1 shall incorporate at least the requirements in Chapters 4 through 12 of this standard.

4.2.2* The organization shall develop written standard operating procedures (SOPs) that shall identify and define the various parts of the program and the various roles and responsibilities of the organization and of the members in the program parts specified in Table 4.2.2.

Table 4.2.2 Required Program Parts for Structural and Proximity Fire Fighting Protective Ensembles and Elements

Program Part	Chapter/Section of NFPA 1851
Records	Section 4.3
Protecting the public and personnel from contamination	Section 4.5
Selection	Chapter 5
Inspection	Chapter 6
Cleaning and decontamination	Chapter 7
Repair	Chapter 8
Storage	Chapter 9
Retirement, disposition, and special incident procedures	Chapter 10

4.2.3* The organization shall not add or permit accessories to be added to any ensemble or ensemble element prior to the organization requesting approval in writing and receiving written approval from the ensemble or ensemble element manufacturer for each specific accessory.

4.2.3.1* The organization shall not add or permit accessories to be added to any ensemble or ensemble element where the organization's request for approval has been responded to in writing with a disapproval from the ensemble or ensemble element manufacturer.

4.2.3.2* In the event that the organization cannot make contact with the ensemble or ensemble element manufacturer for a specific accessory to be used on the ensemble or ensemble element, the organization shall be permitted to evaluate the

Chapter 4 Program

4.1 General.

4.1.1* The organization shall develop and implement a program for the selection, care, and maintenance of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements used by the members of the organization in the performance of their assigned functions.

4.1.2 This program shall have the goal of providing structural fire fighting ensembles and ensemble elements and proximity

accessory for attachment to an ensemble or ensemble element using recognized tests to determine that the accessory does not degrade the performance of the ensemble or ensemble element.

4.2.3.3* In the event the organization's written requests for permission have not received a reply from the ensemble or ensemble element manufacturer for a specific accessory to be used on the ensemble or ensemble element, the organization shall be permitted to evaluate the accessory for attachment to an ensemble or ensemble element using recognized tests to determine that the accessory does not degrade the performance of the ensemble or ensemble element.

4.2.4* The organization shall use one of the following to perform advanced cleaning, advanced inspection, and repair services of ensembles and ensemble elements (*see Table 4.2.4*):

- (1) Manufacturer-trained organization for its own organization's elements only
- (2) Verified organization
- (3) Verified independent service provider (ISP)

4.2.4.1 Verified organizations and verified ISPs shall meet the requirements of Chapter 11, Verification, and shall be verified by a third-party certification organization.

4.2.4.2* Where the organization is a verified organization or uses a verified ISP, approval from the element manufacturer shall not be required.

4.2.4.3* Verified organizations and verified ISPs shall receive written verification from the third-party certification organization to conduct garment element advanced cleaning and advanced inspection services or advanced cleaning, advanced inspection, and advanced repair services.

4.2.4.4 The written verification shall indicate that the verified organization or the verified ISP has demonstrated a thorough knowledge of this standard as well as the design and performance requirements of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.

4.2.4.5 All garment advanced repairs shall be conducted by the garment manufacturer, a verified organization, or a verified ISP.

4.2.4.6 Manufacturer trained organizations performing advanced cleaning and advanced inspection shall be trained by an element manufacturer of the same element type or by a verified ISP. The element manufacturer or verified ISP shall provide documentation that the organization has received the necessary training.

4.2.5* The organization shall develop specific criteria for removal of protective clothing and equipment from service, in accordance with Chapter 10, Retirement, Disposition, and Special Incident Procedure. The criteria for retirement shall include, but not be limited to, issues that are specific to the ensembles or ensemble elements being used by the organization, the manufacturers' instructions, and the experience of the organization.

4.3 Records.

4.3.1* The organization shall compile and maintain records on its structural and proximity fire fighting protective ensembles and ensemble elements.

4.3.2* The records specified in 4.3.1 shall apply to fire fighting protective ensembles and ensemble elements that are utilized by the fire department, including rental or loaner protective ensembles and ensemble elements.

4.3.3 At least the following records shall be kept for each protective ensemble or ensemble element:

- (1) Person to whom element is issued
- (2) Date and condition when issued
- (3) Manufacturer and model name or design
- (4) Manufacturer's identification number, lot number, or serial number
- (5) Month and year of manufacture
- (6) Date(s) and findings advanced inspection(s)

Table 4.2.4 Responsibilities for Garment Element Inspection, Cleaning, and Repair

	MFG	V ISP	V ORG	MT ORG	USER
Routine inspection (6.2)					X
Advanced inspection (6.3)	X	X	X	X	
Complete liner inspection (6.4)	X	X	X	X	
Routine cleaning (7.2)					X
Advanced cleaning and decontamination (7.3)	X	X	X	X	
Basic repair (8.2, 8.3)	X	X	X	X	
Advanced repair (8.2, 8.4)	X	X	X		
Training provider	X	X			
MFG: Element manufacturer. V ISP: Verified ISP. V ORG: Verified organization. MT ORG: Manufacturer-trained organization. USER: End User.					

- (7) Date(s) and findings of advanced cleaning or decontamination
- (8) Reason for advanced cleaning or decontamination and who performed cleaning or decontamination
- (9) Date(s) of repair(s), who performed repair(s), and brief description of repair(s)
- (10) Date of retirement
- (11) Date and method of disposal

4.3.4 The organization shall compile and maintain records as required by 4.3.3 on fire fighting protective ensembles with CBRN protection. The records shall include a list of specific required elements and interface components necessary for structural fire fighting protective ensembles with optional CBRN terrorism agent protection and proximity fire fighting protective ensembles with optional CBRN terrorism agent protection.

4.4 Manufacturer's Instructions.

4.4.1 When issuing new structural fire fighting protective ensembles and ensemble elements or proximity fire fighting protective ensembles and ensemble elements, the organization shall provide users with the instructions provided by the manufacturer on the care, use, and maintenance of the protective ensembles or ensemble elements, including any warnings provided by the manufacturer.

4.4.2* Where the manufacturer's instructions regarding the care or maintenance of the protective ensembles or elements differ from a specific requirement(s) in this standard, the manufacturer's instructions shall be followed for that requirement(s). Manufacturers shall not be permitted to override the requirements of this standard for third-party verification.

4.4.3 The organization shall retain and make accessible to fire department personnel a copy of manufacturers' instructions regarding the care, use, and maintenance of the protective ensembles for reference purposes.

4.5 Protecting the Public and Personnel from Contamination.

4.5.1 The organization shall develop written SOPs that minimize the public's and the fire department personnel's exposure to soiled or contaminated structural or proximity fire fighting protective ensembles and ensemble elements.

4.5.2* The SOPs shall require that protective ensembles or ensemble elements not be worn or stored in the living areas of fire department facilities.

4.5.3* The public shall not be exposed at any time, except during emergency operations, to soiled or potentially contaminated protective ensembles or ensemble elements.

4.5.4 Soiled or potentially contaminated ensembles or ensemble elements shall not be brought into the home, washed in home laundries, or washed in public laundries.

4.6 Reporting Personal Protective Equipment Health and Safety Concerns.

4.6.1* The organization shall report all personal protective equipment (PPE) health and safety concerns, if caused by a known or suspected element failure, to the element manufacturer and certification organization.

4.6.2* The organization shall notify the manufacturer and the certification organization in writing.

4.6.3 The organization shall request written acknowledgment from the element manufacturer and certification organization within 30 days.

Chapter 5 Selection

5.1* Selection and Purchase.

5.1.1* Prior to starting the selection process of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements, the organization shall perform a risk assessment.

5.1.2 The risk assessment shall include, but not be limited to, the hazards that can be encountered by structural or proximity fire fighters based on the following:

- (1)*Type of duties performed
- (2) Frequency of use of ensemble elements
- (3) Organization's experiences
- (4) Incident operations
- (5) Geographic location and climate
- (6)*Specific physical area of operation
- (7)*Likelihood of or response to CBRN terrorism incident

5.1.3* The organization shall review the current edition of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*; NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*; NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*; NFPA 600, *Standard on Industrial Fire Brigades*; and any applicable federal or state OSHA standards relating to structural fire fighting protective ensembles and ensemble elements to determine how they affect the selection process.

5.1.4* The organization shall ensure that elements under consideration are certified as being compliant with NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, by a third-party certification organization.

5.1.5* Based on the risk assessment, the organization shall compile and evaluate information on the comparative strengths and weaknesses of the elements under consideration.

5.1.6 The organization shall ensure the proper interface between ensemble elements, including, but not limited to, coat-to-hood and helmet, coat-to-pant, coat-to-glove, and pants-to-footwear. Any other specialty equipment being used shall also be considered to ensure the equipment does not interfere with the proper function and interface of the protective ensemble or ensemble elements.

5.1.7* Where a field evaluation of an ensemble or ensemble element is conducted, the organization shall establish criteria to ensure a systematic method of comparing products in a manner related to their intended use and assessing their performance relative to the organization's expectations.

5.1.8* Where the organization develops purchase specifications, at least the following criteria shall be included:

- (1) Purchase specifications shall require that the ensemble or ensemble element(s) to be purchased shall be compliant with the current edition of NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*. Purchasers shall consider that ensembles that are

certified to the optional CBRN requirement are tested and certified as ensembles and must be worn as an ensemble with all elements and interface components present as stated on the element label.

- (2)*Where the organization selects criteria that exceed the minimum requirements of the current edition of NFPA 1971, such criteria shall be stipulated in the purchase specifications.
- (3)*Purchase specifications shall require that manufacturers' bids include substantiation of certification for each element and model stated in the bid.
- (4)*Where applicable, the purchase specifications shall define the process for determining proper fit.
- (5)*The organization shall compare each bid submittal against purchase specifications.

5.1.9 Upon receipt, organizations shall inspect purchased protective ensemble element(s) to determine that they meet their specifications and that they were not damaged during shipment. Organizations shall also verify the quantity and sizes of the protective ensemble element(s) received.

5.1.10 Organizations shall examine information supplied with the products, such as instructions, warranties, and technical data.

5.1.11 Procedures shall be established for returning unsatisfactory products if the organization's specifications are not met.

Chapter 6 Inspection

6.1 General.

6.1.1 Universal precautions shall be observed, as appropriate, when handling ensemble elements.

6.1.2 Any ensemble elements that are found to be soiled or contaminated shall be cleaned or decontaminated before any additional inspection is initiated. Where ensemble elements are found to be contaminated by CBRN agents, the ensemble shall be retired.

6.1.3* The organization shall establish guidelines for its members to follow in determining if an element is soiled to an extent that cleaning is necessary.

6.1.4 The organization shall determine appropriate actions to be taken if an element is found to be in need of cleaning, decontamination, or repair.

6.1.4.1 As a minimum, any necessary cleaning or decontamination shall be done in accordance with the requirements specified in Chapter 7.

6.1.4.2 As a minimum, any necessary repairs shall be made in accordance with the requirements specified in Chapter 8.

6.1.4.3 As a minimum, any necessary testing shall be conducted in accordance with the methods specified in Chapter 12.

6.2 Routine Inspection.

6.2.1 Individual members shall conduct a routine inspection of their protective ensembles and ensemble elements upon issue and after each use.

6.2.2* The routine inspection shall include, as a minimum, the inspections specified in 6.2.2.1 through 6.2.2.7.

6.2.2.1 Coat and trouser garment elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Rips, tears, and cuts
 - (b) Damaged or missing hardware and closure systems
 - (c) Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (4) Damaged or missing reflective trim
- (5) Loss of seam integrity and broken or missing stitches
- (6) Correct assembly and size compatibility of shell, liner, and the drag rescue device (DRD)

6.2.2.2 Hood elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (4) Loss of face opening adjustment
- (5) Loss of seam integrity and broken or missing stitches

6.2.2.3 Helmet elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage to the shell such as the following:
 - (a) Cracks, crazing, dents, and abrasions
 - (b) Thermal damage to the shell (bubbling, soft spots, warping, discoloration)
- (4) Physical damage to the earflaps such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting)
- (5) Damaged or missing components of the suspension and retention systems
- (6)*Damaged or missing components of the faceshield/goggle system, including discoloration, crazing, and scratches to the faceshield/goggle lens limiting visibility
- (7) Damaged or missing reflective trim
- (8) Loss of seam integrity and broken or missing stitches

6.2.2.4 Glove elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting, discoloration of any layer)
 - (c) Inverted liner
- (4) Shrinkage
- (5) Loss of elasticity or flexibility
- (6) Loss of seam integrity and broken or missing stitches

6.2.2.5 Footwear elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Cuts, tears, and punctures
 - (b) Thermal damage (charring, burn holes, melting, discoloration of any layer)

- (c) Exposed or deformed protective toe, protective midsole, or shank
- (4) Loss of water resistance
- (5) Closure system component damage and functionality
- (6) Loss of seam integrity and broken or missing stitches

6.2.2.6 DRD components shall be inspected for the following:

- (1) Installation in garment
- (2) Soiling
- (3) Contamination
- (4) Physical damage such as the following:
 - (a) Cuts, tears, punctures, cracking, or splitting
 - (b) Thermal damage (charring, burn holes, melting, discoloration)
 - (c) Loss of seam integrity and broken or missing stitches

6.2.2.7 Interface components shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage
- (4) Loss or reduction of properties that allow component to continue as effective interface [e.g., loss of shape or inability to remain attached to the respective element(s) where attachment is required]
- (5) Loss of seam integrity and broken or missing stitches

6.2.3 Additional Routine Inspection Requirements for Proximity Fire Fighting Protective Ensembles and Ensemble Elements.

6.2.3.1 Proximity fire fighting coat and trouser garment elements shall be inspected for the following:

- (1) Loss of reflectivity
- (2) Loss of reflective coating(s)
- (3) Delamination as evidenced by separation or peeling of the outer shell

6.2.3.2 Proximity fire fighting helmet element overcover shall be inspected for the following:

- (1) Loss of reflectivity
- (2) Loss of reflective coating(s)
- (3) Delamination as evidenced by separation or peeling of the outer shell
- (4) Damaged or missing reflective trim, if applicable
- (5) Damage and functionality of the overcover to helmet attachment

6.2.3.3 Proximity fire fighting shrouds shall be inspected for the following:

- (1) Loss of reflectivity
- (2) Loss of reflective coating(s)
- (3) Delamination as evidenced by separation or peeling of the outer shell
- (4) If applicable, damage and functionality of the shroud-to-helmet attachment
- (5) Distortion of face opening resulting in gaps around the faceshield

6.2.3.4 Proximity fire fighting helmet elements shall be inspected for the following:

- (1) Loss of faceshield reflectivity
- (2) Loss of shell reflectivity, if applicable

6.2.3.5 Proximity fire fighting glove elements shall be inspected for the following:

- (1) Loss of reflectivity
- (2) Loss of reflective coating(s)

6.2.3.6 Proximity fire fighting footwear elements shall be inspected for the following:

- (1) Loss of reflectivity
- (2) Loss of reflective coating(s)

6.3 Advanced Inspection.

6.3.1 Advanced inspection and any necessary testing shall be performed by the element manufacturer, a manufacturer trained organization, a verified organization, or a verified ISP.

6.3.2 The member(s) of the organization who has received training in the advanced inspection of the ensembles or ensemble elements shall be responsible for performing, managing, or coordinating advanced inspections or the advanced inspection process.

6.3.2.1* The ensemble or ensemble element manufacturer or a verified ISP and the organization shall determine the level of training required to perform advanced inspections. The ensemble or ensemble element manufacturer or verified ISP shall provide written verification of training.

6.3.2.1.1 If the organization is a verified organization, it shall be permitted to determine the level of training necessary to perform the advanced inspection without any further written verification.

6.3.3* Advanced inspections of all protective ensemble elements that are issued shall be conducted at a minimum of every 12 months, or whenever routine inspections indicate that a problem could exist.

6.3.3.1 Ensemble elements that have been properly stored in accordance with Chapter 9 and are not being used are not required to be subjected to advanced inspection.

6.3.4* The findings of the advanced inspection shall be documented.

6.3.5* The advanced inspection shall include, as a minimum, the inspections specified in 6.3.5.1 through 6.3.5.7 and for garment elements only the testing specified in Section 12.1 and Section 12.2. The complete liner inspection shall be permitted to be conducted as part of the advanced inspection in lieu of the testing specified in Section 12.1 and Section 12.2.

6.3.5.1* All separable layers of the garment elements shall be individually inspected for the following:

- (1) Soiling
- (2) Contamination
- (3)*Physical damage to all layers, such as the following:
 - (a) Rips, tears, cuts, and abrasions
 - (b) Damaged or missing hardware
 - (c) Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (4)*Loss of moisture barrier integrity as indicated by any of the following:
 - (a) Rips, tears, cuts, or abrasions
 - (b) Discoloration
 - (c) Thermal damage
- (5) Evaluation of system fit and coat/trouser overlap
- (6) Loss of seam integrity and broken or missing stitches

- (7)*Loss of material physical integrity [e.g., ultraviolet (UV) or chemical degradation] as evidenced by discoloration, significant changes in material texture, loss of material strength, loss of liner material, and shifting of liner material
- (8) Loss of wristlet elasticity, stretching, runs, cuts, or burn holes
- (9)*Reflective trim integrity, attachment to garment, reflectivity, or damage
- (10)*Label integrity and legibility
- (11) Hook and loop functionality
- (12) Liner attachment systems
- (13) Closure system functionality
- (14) Accessories for compliance with 4.2.3
- (15) Correct assembly and size compatibility of shell, liner, and DRD

6.3.5.2 Hood elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting, discoloration of any layer)
- (4) Shrinkage
- (5) Loss of material elasticity or stretching out of shape
- (6) Loss of seam integrity or broken or missing stitches
- (7) Loss of face-opening adjustment
- (8)*Label integrity and legibility

6.3.5.3 Helmet elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage to the shell such as the following:
 - (a) Cracks, dents, and abrasions
 - (b) Thermal damage to the shell (bubbling, soft spots, warping, or discoloration)
- (4) Physical damage to the ear flaps such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting or discoloration of any layer)
- (5) Damaged or missing components of the suspension and retention systems
- (6) Functionality of suspension and retention systems
- (7) Damaged or missing components of the faceshield/goggle system, including discoloration or scratches to the faceshield/goggle lens limiting visibility
- (8) Functionality of faceshield/goggle system
- (9) Damage to the impact cap
- (10) Damaged or missing reflective trim
- (11) Accessories for compliance with 4.2.3
- (12) Loss of seam integrity and broken or missing stitches
- (13)*Label integrity and legibility

6.3.5.4 Glove elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3)*Physical damage such as the following:
 - (a) Rips, tears, and cuts
 - (b) Thermal damage (charring, burn holes, melting or discoloration of any layer)
 - (c) Inverted liner
 - (d) Loss of seam integrity or broken or missing stitches

- (4) Shrinkage
- (5) Loss of flexibility
- (6) Loss of elasticity and shape in wristlets
- (7) Accessories for compliance with 4.2.3
- (8)*Label integrity and legibility

6.3.5.5 Footwear elements shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage such as the following:
 - (a) Cuts, tears, punctures, cracking, or splitting
 - (b) Thermal damage (charring, burn holes, melting or discoloration of any layer)
 - (c) Exposed or deformed steel toe, steel midsole, or shank
 - (d) Loss of seam integrity, delamination, or broken or missing stitches
- (4) Loss of water resistance
- (5) Closure system component damage and functionality
- (6)*Excessive tread wear
- (7) Condition of lining such as the following:
 - (a) Tears
 - (b) Excessive wear
 - (c) Separation from outer layer
- (8) Heel counter failure
- (9) Accessories for compliance with 4.2.3
- (10)*Label integrity and legibility

6.3.5.6 Interface components shall be inspected for the following:

- (1) Soiling
- (2) Contamination
- (3) Physical damage
- (4) Loss or reduction of properties that allow component to continue as effective interface, such as loss of shape or inability to remain attached to the respective element(s), if attachment is required
- (5) Loss of seam integrity and broken or missing stitches

6.3.5.7 DRD components shall be inspected for the following:

- (1) Installation in garment
- (2) Soiling
- (3) Contamination
- (4) Physical damage such as the following:
 - (a) Cuts, tears, punctures, cracking, or splitting
 - (b) Thermal damage (charring, burn holes, melting, or discoloration)
 - (c) Loss of seam integrity and broken or missing stitches
- (5)*Label integrity and legibility

6.3.6 Additional Advanced Inspection Criteria for Proximity Fire Fighting Protective Ensembles and Ensemble Elements.

6.3.6.1 Proximity fire fighting garment elements shall be inspected for the following:

- (1) Loss of radiant reflectivity
- (2) Loss of radiant reflective coating(s)
- (3) Delamination as evidenced by separation or peeling of the outer shell