

**NFPA®**

**1877**

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Standard on  
Selection, Care, and Maintenance  
of Wildland Firefighting Protective  
Clothing and Equipment

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**2022**



# NFPA® 1877

## Standard on Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment

### 2022 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471  
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## NFPA® 1877

### Standard on

## Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment

### 2022 Edition

This edition of NFPA 1877, *Standard on Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment*, was prepared by the Technical Committee on Wildland Fire Fighting Protective Clothing and Equipment and released by the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on March 18, 2021, with an effective date of April 8, 2021.

This edition of NFPA 1877 was approved as an American National Standard on April 8, 2021.

### Origin and Development of NFPA 1877

This first edition of NFPA 1877, *Standard on Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment*, was created to specify the minimum requirements for the selection, care, and maintenance of the wildland firefighting protective clothing and equipment that are compliant with NFPA 1977. This equipment includes garments, helmets, gloves, footwear, face/neck shrouds, goggles, chain saw protection, and load-carrying equipment.

The standard does not specify requirements for organizational programs — the appropriate use of structural firefighting or proximity firefighting protective ensembles; wildland firefighting protective clothing and equipment for training or operations; or for infection control. Such programs are under the jurisdiction of other NFPA standards, including NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

The purpose of this standard is to establish basic criteria for selection, inspection, cleaning, decontamination, repair, storage, and retirement of wildland firefighting protective clothing and equipment, and to establish a program that uses these criteria to reduce the safety risks and potential health risks associated with poorly maintained, contaminated, or damaged protective clothing and equipment.

The standard follows the structure of other NFPA standards concerning the selection, care, and maintenance of personal protective equipment (PPE):

- (1) Chapter 1 describes the scope and purpose.
- (2) Chapter 2 lists references used in the standard.
- (3) Chapter 3 has definitions used in the document.
- (4) Chapter 4 has program organization.
- (5) Chapter 5 has selection information.
- (6) Chapter 6 concerns inspection.
- (7) Chapter 7 has cleaning and decontamination information.
- (8) Chapter 8 contains requirements for repair.
- (9) Chapter 9 has storage requirements.
- (10) Chapter 10 has criteria for retirement, disposition, and special incident procedures.
- (11) Chapter 11 has information for independent service provider (ISP) verification.

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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 clothing and protective equipment, except respiratory protective equipment, that provides hand, foot, torso, limb and head protection, as well as interface protection for fire fighters or other emergency services responders during incidents involving wildland fire fighting operations. These operations include the activities of fire suppression and property conservation in forest, brush, grass, ground cover, and other such vegetation that is not within structures but that is involved in fire. Additionally, this Committee shall have primary responsibility for documents on the selection, care, and maintenance of wildland fire fighting protective clothing and protective equipment by fire and emergency services organizations and personnel.



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## NFPA 1877

## Standard on

**Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment**

## 2022 Edition

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A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

**Chapter 1 Administration****1.1 Scope.**

**1.1.1** This standard shall specify the minimum requirements used for selection, care, and maintenance of wildland firefighting protective clothing and equipment that are compliant with NFPA 1977, including garments, helmets, gloves, footwear, face/neck shrouds, goggles, chain saw protection, and load-carrying equipment.

**1.1.2** This standard shall not specify requirements for other organizational programs, such as appropriate use of wildland firefighting protective clothing and equipment for training, for operations, or for infection control, because such programs are under the jurisdiction of other NFPA standards.

**1.1.3** This standard shall not apply to protective ensembles or protective clothing that are compliant with NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

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

**1.1.5** 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 clothing and equipment 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.

**1.1.6** 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 basic criteria for selection, inspection, cleaning, decontamination, repair, storage, and retirement of wildland firefighting protective clothing and equipment.

**1.2.2** The purpose of this standard shall be to establish a program that uses these criteria to reduce the safety risks and potential health risks associated with poorly maintained, contaminated, or damaged wildland firefighting protective clothing and equipment.

**1.3 Application.**

**1.3.1** This standard shall apply to wildland firefighting clothing and equipment certified as compliant with NFPA 1977.

**1.3.2** This standard shall not apply to other organizational programs such as appropriate use of wildland firefighting protective clothing and equipment for training, operations, or infection control, because such programs are under the jurisdiction of other NFPA standards.

**1.3.3** This standard shall not apply to respiratory protective equipment other than where such equipment interfaces with wildland firefighting protective clothing and equipment.

**1.3.4** The requirements of this standard shall not apply to accessories attached to any element of the wildland firefighting protective clothing and equipment 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** Values in parentheses shall not be considered as the requirements because these values might not be exact equivalents.

**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 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2020 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting*, 2022 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2016 edition.

NFPA 1992, *Standard on Liquid Splash—Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2018 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2018 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations*, 2018 edition.

## 2.3 Other Publications.

**2.3.1 ISO Publications.** International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandinnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 17011:2017(E), *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*, 2004.

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

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, 2012.

## 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.** An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that 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 NFPA Manuals of Style. When used in a generic sense, such as in the phrase “standards development process” or “standards development activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

## 3.3 General Definitions.

**3.3.1 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 Base-Layer Garment.** The first layer of a textile structure that is in direct contact with the skin (e.g., briefs, t-shirts, bras, socks).

**3.3.3 Biological Terrorism Agents.** Liquid or particulate agents that 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 Care.** Procedures for cleaning, decontamination, and storage of protective clothing and equipment.

**3.3.6 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).

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

**3.3.8 Cleaning.** The act of removing soils and contaminants from clothing and equipment by mechanical, chemical, thermal, or combined processes.

**3.3.9 Contamination/Contaminated.** The process by which clothing and equipment are exposed to hazardous materials, body fluids, or chemical, biological, radiological, and nuclear (CBRN) terrorism agents.

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

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

**3.3.12 Decontamination.** The act of removing contaminants from protective clothing and equipment by a physical, chemical, or combined process. (*See also 3.3.8, Cleaning.*)

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

**3.3.14 Field Evaluation.** The nonlaboratory assessment of an element.

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

**3.3.16 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.

**3.3.17 Functionality.** The ability of the clothing and equipment or a component to continue to be utilized for its intended purpose.

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

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

**3.3.20 Independent Service Provider (ISP).** See 3.3.34, Verified Independent Service Provider (ISP).

**3.3.21 Integrity.** The ability of an element to remain intact and provide continued minimum performance.

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

**3.3.23 Major A Seam.** Seam assemblies where rupture exposes the wearer to immediate danger.

**3.3.24 Manufacturer.** The entity that directs and controls the 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.

**3.3.25 Manufacturer-Trained Organization.** A nonverified organization trained by an element manufacturer of the same element type to conduct advanced cleaning, advanced inspection, and/or basic repair on the organization's clothing and equipment.

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

**3.3.27 Minor Seam.** Remaining seam assemblies that are not classified as major seams.

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

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

**3.3.30 Selection.** The risk assessment process used to determine 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.

**3.3.31 Soiled/Soiling.** The accumulation of materials that are not considered hazardous but could degrade the performance of the element.

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

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

**3.3.34 Verified Independent Service Provider (ISP).** An independent service provider verified by a third-party certification organization to conduct cleaning, repair service, or both.

**3.3.35\* Verified Organization.** An organization, verified by a third-party certifier, to conduct cleaning, repair service, or both.

## Chapter 4 Program

### 4.1 General.

**4.1.1\*** The organization shall develop and implement a program for the selection, care, and maintenance of wildland firefighting personal protective equipment (PPE) 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 wildland firefighting PPE that are suitable and appropriate for the intended use; maintaining such protective PPE in a safe, usable condition to provide the intended protection to the user; removing from use such PPE that could cause or contribute to user injury, illness, or death because of its condition; and reconditioning, repairing or retiring such PPE.

**4.1.3** Where this program for the selection, care, and maintenance of wildland firefighting PPE is part of an organization's overall program on protective clothing and protective equipment, the portion of the organization's overall program that affects wildland firefighting PPE shall be in accordance with Section 4.2.

### 4.2 Program Organization for Wildland Firefighting PPE.

**4.2.1** The organization shall develop written standard operating procedures (SOP) that shall identify and define the various



parts of the program and the various roles and responsibilities of the organization and of the members.

**4.2.2** The program shall at least incorporate the requirements within the chapters listed in Table 4.2.2.

**4.2.3\*** The organization shall establish policy regarding base-layer garments that are permitted to be worn under the PPE assigned by the organization.

**4.2.3.1** The organization shall establish procedures for evaluating base-layer garments to determine whether or not the base-layer garment will affect the performance of the PPE.

**4.2.3.2** The organization shall contact the PPE manufacturer for advice and/or data as to what base-layer garment(s) the PPE manufacturer permits to be used with its specific product(s).

**4.2.3.3** The organization shall not permit base-layer garments that would degrade the performance of the PPE.

**4.2.4** The organization shall establish a policy regarding accessories that are permitted to be attached to the organization's PPE.

**4.2.4.1** The organization shall establish procedures for evaluating accessories to determine whether the accessories will affect the performance of the PPE.

**4.2.4.2** The organization shall contact the PPE manufacturer for advice and/or data as to what accessories the PPE manufacturer permits to be used with its specific product(s).

**Table 4.2.2 Required Program Parts for Wildland Firefighting PPE**

| Program Part   | Chapter/Section |
|--|-----------------|
| 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      |

**4.2.4.3** The organization shall not add accessories and shall not permit accessories to be added to PPE that would degrade the performance of the PPE.

**4.2.5\*** The organization shall use one of the following to perform cleaning, inspection, and repair services of PPE, as shown in Table 4.2.5:

- (1) Manufacturer-trained organization for the organization's PPE only
- (2) Verified organization
- (3) Verified independent service provider (ISP)

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

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

**4.2.5.3\*** 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.

**4.2.5.4** 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 1977.

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

**4.2.5.6** 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.

**4.2.5.7** The element manufacturer or verified ISP shall provide documentation that the organization has received the necessary training.

**4.2.6** The organization shall develop specific criteria for removal of protective clothing and equipment from service, in accordance with Chapter 10. The criteria for retirement shall include, but not be limited to, issues that are specific to the clothing and equipment being used by the organization, the manufacturers' instructions, and the experience of the organization.

**Table 4.2.5 Responsibilities for Garment Element Inspection, Cleaning, and Repair**

|  | Element Manufacturer | Verified ISP | Verified Organization | Manufacturer-Trained Organization | End User |
|--|----------------------|--------------|-----------------------|-----------------------------------|----------|
| Inspection (Chapter 6)                   | x                    | x            | x                     | x                                 | x        |
| Cleaning and decontamination (Chapter 7) | x                    | x            | x                     | x                                 | x        |
| Repair (Chapter 8)                       | x                    | x            | x                     | x                                 |          |
| Training provider                        | x                    | x            |                       |                                   |          |

### 4.3 Records.

**4.3.1** The organization shall compile and maintain records on their wildland firefighting PPE.

**4.3.2** At least the following records shall be kept for each PPE:

- (1) Manufacturer and model name or design
- (2) Manufacturer's identification number, lot number, or serial number
- (3) Month and year of manufacture

### 4.4 Manufacturer's Instructions.

**4.4.1** When issuing new PPE, the organization shall provide users with the instructions provided by the PPE's manufacturer on the care, use, and maintenance of the PPE, including any warnings provided by the manufacturer.

**4.4.2** Unless otherwise specified herein, where the manufacturer's instructions regarding the care or maintenance of its PPE differ from a specific requirement in this standard, the manufacturer's instructions shall be followed for that requirement.

**4.4.3** The organization shall retain a copy of manufacturer's instructions regarding the care, use, and maintenance of their PPE.

**4.5 Protecting the Public and Personnel from Contamination.** The organization shall develop written SOPs that minimize the public's exposure to contaminated PPE.

**4.5.1** The SOPs shall require that contaminated PPE not be worn or stored in the living areas of fire department facilities.

**4.5.2** The public shall not be exposed at any time, except during emergency operations, to contaminated PPE.

**4.5.3** Contaminated PPE 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 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 of such known or suspected element failures.

**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 wildland firefighting PPE, a risk assessment shall be performed. The risk assessment shall include, but not be limited to, the hazards that wildland firefighters could encounter, based on the following:

- (1) Type of duties performed
- (2) Frequency of use of clothing and equipment
- (3) Organization's experiences
- (4) Incident operations
- (5) Geographic location and climate

**5.1.2** The organization shall review the current editions of NFPA 1977 and NFPA 1500 and any applicable federal or state OSHA standards, as well as organizational rules and regulations, relating to wildland firefighting in order to determine how they affect the selection process.

**5.1.3** The organization shall confirm that the PPE is certified by a third-party certification organization as being compliant with NFPA 1977.

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

**5.1.5** The organization shall ensure that the items under consideration interface properly with the other personal protective items with which they will be used.

**5.1.6** Where a field evaluation is conducted, the organization shall establish criteria to ensure a systematic evaluation.

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

- (1) Purchase specifications shall require that the items to be purchased are compliant with the current edition of NFPA 1977.
- (2) Where the organization selects criteria that exceed the minimum of NFPA 1977, such criteria shall be stipulated in the purchase specifications.
- (3) Purchase specifications shall require that manufacturers' bids include substantiation of certification for each item and model stated in their bids.
- (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.

**5.1.8** Upon receipt, organizations shall inspect purchased protective items to ensure they meet the organizations' specifications and that they were not damaged during shipment. Organizations shall also verify quantity and sizes of the protective items received.

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

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

**5.1.11\*** The organization's needs assessment shall be written into a specification of performance and/or design requirements for the wildland firefighting PPE.

**5.1.12\*** Using the written specifications, the organization shall select a supplier or shall solicit bids from manufacturers or vendors of wildland firefighting PPE.

**5.1.13\*** The organization shall carefully check bid quotation and any supplied samples of the wildland firefighting PPE against the bid specifications.

**5.1.14** The organization shall recommend the award of the contract to the selected manufacturer or vendor to the purchasing authority.

**5.1.15\*** Upon delivery of the wildland firefighting PPE purchased, the organization shall inspect the order for completeness against the purchase specifications.

**5.1.16** The organization shall periodically review and document how the wildland firefighting PPE specifications meet the organization's needs and applicable standards and revise specifications as needed for new or replacement equipment.

**5.2\* Specific Requirements for Wildland Firefighting Protective Garments, Cold Weather Protection, and Face and Neck Shrouds.**

**5.2.1\* Protective Garments.** The organization shall ensure that wildland firefighting protective garments and cold weather protection provide limited thermal and physical protection from the hazards associated with wildland firefighting.

**5.2.2 Cold Weather Protection.** The organization shall ensure that wildland firefighting cold weather protection include, but are not limited to, jacket, shirt, trousers, cold weather outerwear, or one-piece garment which provides thermal and limited physical protection from the hazards associated with wildland firefighting.

**5.2.3 Face and Neck Shrouds.** The organization shall ensure that wildland firefighting face and neck shrouds provide at least minimum thermal protection to the face and neck.

**5.2.4 Compatibility.** The organization shall ensure that wildland firefighting garments are compatible with gloves and footwear in order to provide continuous minimum protection to the upper and lower torsos, the hands, and the feet.

## Chapter 6 Inspection

### 6.1\* General.

**6.1.1** Universal precautions shall be observed, as appropriate, in the handling of clothing and equipment.

**6.1.2** Items contaminated by hazardous materials or biological agents shall be decontaminated before any additional inspection is initiated.

**6.1.3\*** The organization shall establish guidelines for its members to follow in determining when an item is soiled to the extent that cleaning is necessary.

**6.1.4** The organization shall determine appropriate actions to be taken if an item 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.

### 6.2 Inspection.

**6.2.1** Inspections of all issued PPE shall be conducted at the time of issue, after each use, or at a minimum every 12 months by individual members or members who have been trained to perform the inspection.

**6.2.2** The organization shall establish what constitutes "use" to include at least each time an item is exposed or is suspected of having been exposed to damage or contamination.

**6.2.3** The inspection shall include, as a minimum, the inspections specified in 6.2.3.1 through 6.2.3.7.

**6.2.3.1** Garments and face/neck shrouds shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:
  - (a) Rips, tears, and cuts
  - (b) Damaged or missing hardware and closure systems
  - (c) Thermal damage, such as charring, burn holes, and melting
- (4) Damaged or missing retroreflective trim

**6.2.3.2** Helmets shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage to the shell, such as the following:
  - (a) Cracks, crazing, dents, and abrasions
  - (b) Thermal damage to the shell, such as bubbling, soft spots, warping, or discoloration
- (4) Damaged or missing components of the suspension and retention systems
- (5) Damaged or missing retroreflective trim

**6.2.3.3** Gloves shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:
  - (a) Rips, tears, and cuts
  - (b) Thermal damage, such as charring, burn holes, and melting
- (4) Shrinkage
- (5) Loss of elasticity/flexibility

**6.2.3.4** Footwear shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:
  - (a) Cuts, tears, and punctures
  - (b) Thermal damage, such as charring, burn holes, and melting
- (4) Closure system component damage and functionality

**6.2.3.5** Goggles shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:
  - (a) Damage to the frame
  - (b) Excessive scratching or fogging of the lenses
  - (c) Loss of elasticity and adjustment of headband
  - (d) Thermal damage, such as charring, burn holes, and melting

**6.2.3.6** Chain saw leg protectors shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:



- (a) Rips, tears, and cuts
- (b) Thermal damage, such as charring, burn holes, and melting
- (4) Shrinkage
- (5) Loss of flexibility
- (6) Functionality of all hardware, including buckles, slides, and zippers

**6.2.3.7** Load-carrying protective equipment shall be inspected for the following:

- (1) Soiling
- (2) Contamination from hazardous materials or biological agents
- (3) Physical damage, such as the following:
  - (a) Rips, tears, and cuts
  - (b) Thermal damage, such as charring, burn holes, and melting
- (4) Shrinkage
- (5) Loss of flexibility
- (6) Functionality of all hardware, including buckles, slides, and zippers

## Chapter 7 Cleaning and Decontamination

### 7.1\* General.

**7.1.1\*** Organizations shall provide a means for having PPE cleaned and decontaminated.

**7.1.2** Contaminated PPE shall not be brought into the home or washed in home laundries.

**7.1.3** The use of public laundries shall be permitted when a procedure to decontaminate the machines after use is established.

**7.1.4** Commercial dry cleaning shall not be used as a means of cleaning or decontaminating PPE unless approved by the PPE or element manufacturer.

**7.1.5\*** When a commercial cleaning service or ISP is used, it shall demonstrate to the organization's satisfaction that procedures for cleaning and decontamination do not compromise the performance of PPE.

### 7.2 Garments.

**7.2.1\*** Cleaning of soiled wildland firefighting PPE shall be done in accordance with manufacturers' recommendations and instructions.

**7.2.2** Contaminated wildland firefighting garments shall be either laundered in washing equipment dedicated solely to that purpose or properly disposed of.

**7.2.2.1** The public shall not be exposed at any time to contaminated garments.

**7.2.2.2\*** PPE shall not be brought into the home and washed in home laundries.

**7.2.2.3** If contaminated protective garments are to be laundered, organizations shall provide a washing machine(s) for the sole purpose of cleaning contaminated protective garments or shall contract with an outside service for that purpose.

**7.2.2.4\*** Unless specifically advised otherwise by manufacturers' instructions, the following cautions shall be heeded:

- (1) Bleach shall not be used.
- (2) Garments shall be, as a minimum, double rinsed.
- (3) Water temperature shall not exceed 40°C (105°F).
- (4) A mild detergent with a pH range of not less than 6.0 pH and not greater than 10.5 pH as indicated on the product safety data sheet (SDS) or original product container shall be used.
- (5) Garments shall not be exposed to direct sunlight, indirect sunlight, or fluorescent light when air dried.

**7.2.3\*** Organizations shall be permitted to use a contract cleaning service for cleaning of wildland firefighting PPE.

### 7.3 Helmets.

**7.3.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures that the manufacturer provided with the element. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.3.2** Helmets shall not be machine cleaned or dried.

**7.3.3** Helmet shells, headbands, crown straps, and suspension systems shall be cleaned in a utility sink using mild detergent and water.

**7.3.4** Helmets and suspension systems shall be air dried out of direct sunlight, indirect sunlight, or fluorescent light.

**7.3.5** The manufacturer shall be consulted if stronger cleaning agents are required.

**7.3.6** Do not use solvents.

### 7.4 Goggles.

**7.4.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures that the manufacturer provided with the element. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.4.2** Goggles shall not be machine cleaned or dried.

**7.4.3\*** Goggle bodies, attachments, and lenses shall be cleaned using a soft dry cloth.

**7.4.4** The manufacturer shall be consulted if stronger cleaning agents are required.

### 7.5 Gloves.

**7.5.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures that the manufacturer provided with the element. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.5.2** Gloves shall not be machine dried with heat.

### 7.6 Footwear.

**7.6.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures provided by the manufacturer. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.6.2** Footwear shall not be machine cleaned or machine dried.

**7.6.3** Footwear shall be cleaned in a utility sink using mild detergent (pH range  $\geq 6.0$  and  $\leq 10.5$  as indicated on the product SDS or original product container), water, and a soft bristle brush.

**7.6.4** The manufacturer shall be consulted if stronger cleaning agents are required.

**7.6.5** Footwear shall be air dried in a well-ventilated area, away from direct sunlight, indirect sunlight, or fluorescent light.

**7.7 Face and Neck Shrouds.** See Section 7.2 for garment requirements.

**7.8 Wildland Firefighting Load-Carrying Protective Equipment.**

**7.8.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures provided by the manufacturer. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.8.2** Load-carrying protective equipment shall not be machine washed.

**7.8.3** Load-carrying protective equipment shall not be machine dried using heat.

**7.9 Wildland Firefighting Chain Saw Leg Protectors.**

**7.9.1** Organizations shall examine the manufacturer's label and user information for instructions on cleaning and drying procedures provided by the manufacturer. In absence of manufacturer's instructions or manufacturer's approval of alternative procedures, the cleaning and drying procedures provided in this section shall be used.

**7.9.2** Wildland firefighting chain saw leg protectors shall not be machine cleaned, machine dried, or pressure washed.

**7.9.3** Wildland firefighting chain saw leg protectors shall be cleaned in a utility sink or soak tank using a citrus-based cleaner (pH range  $\geq 6.0$  and  $\leq 10.5$  as indicated on the product SDS or original product container) and a brush, then rinsed thoroughly with clean water.

**7.9.4** Wildland firefighting chain saw leg protectors shall be air dried in a well-ventilated area, away from direct sunlight, indirect sunlight, and fluorescent light.

**7.9.5\*** If excessive soiling by chain saw fuel and bar oil cannot be decontaminated by normal manufacturer's instructions, the leg protectors shall be retired.

## Chapter 8 Repair

### 8.1 Garment Repair.

**8.1.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of clothing and equipment and is responsible for performing or managing specialized repairs.

**8.1.2** Garments shall be cleaned before any repair work is undertaken.

**8.1.3** All repairs and alterations to garments shall be done in a manner approved by the manufacturer and using materials approved by the manufacturer, including, but not limited to, fabric, thread type, stitch construction, hardware, and hardware backing.

**8.1.4** Because there are different methods of construction, the clothing manufacturer shall be contacted if the organization is unsure whether a field repair can be made without adversely affecting the integrity of the garment.

**8.1.5** Major repairs to the garment shall be accomplished only by the manufacturer or by a manufacturer-recognized repair facility consistent with the manufacturer's instructions and methods. The manufacturer shall be contacted if the organization is unsure whether a repair is major or minor or can be accomplished without adversely affecting the integrity of the garment.

**8.1.6** Repairs shall be completed on all components that have been damaged.

**8.1.7** Repairs and alterations shall be performed using seaming methods consistent with the manufacturer's instructions. Seaming methods shall include, but not be limited to, seam type, stitches per inch, and manner of construction.

**8.1.8\*** Restitching of more than 1 in. (2.5 cm), continuous, of a major seam either shall require consulting the manufacturer or shall be performed by the manufacturer or by a manufacturer-recognized repair facility in a manner consistent with the manufacturer's instructions.

**8.1.9** All minor seams shall be repaired or altered in a manner consistent with the manufacturer's instructions.

**8.1.10** All repaired stress areas shall be reinforced in a manner consistent with the manufacturer's instructions.

#### 8.1.11 Repair Criteria.

**8.1.11.1** Repairs of minor tears, char marks, ember burns, and abraded areas shall be limited to those where the damaged area can be covered by a maximum of a 50 in.<sup>2</sup> (32 cm<sup>2</sup>) patch.

**8.1.11.2** The finished edge of the patch shall extend at least 1 in. (2.5 cm) in all directions beyond the damaged area.

**8.1.11.3** To prevent fraying, the patch shall have no raw edges.

**8.1.11.4** To prevent further damage, tears, holes, and abrasions shall be mended prior to the patch being applied.

#### 8.1.12 Trim Repair.

**8.1.12.1** Replacement trim shall be obtained from the garment manufacturer or the manufacturer's recognized source and installed in a manner consistent with the garment manufacturer's method of construction.

**8.1.12.2** Trim being replaced shall be completely removed so that no new trim is sewn over older trim.

**8.1.12.3** If a repair or alteration necessitates replacing trim, an equal amount of trim shall be installed; no repair or alteration shall result in a reduction of the total amount of trim on the garment.

**8.1.12.4** If replacing trim necessitates sewing into a major A seam, trim replacement shall be done only by the manufacturer or by a repair facility recognized by the manufacturer.

**8.1.12.5** If unsure of the complexity of the repair, the organization shall consult the manufacturer.

#### **8.1.13 Hardware.**

**8.1.13.1** Replacement hardware shall be installed in a manner consistent with the garment manufacturer's method of construction.

**8.1.13.2** Replacement hardware shall be obtained from the garment manufacturer or the manufacturer's recognized source.

**8.1.13.3** Where hardware is to be replaced, the reinforcement backing material either shall be reinstalled or, if no longer serviceable, shall be replaced.

**8.1.13.4** If unsure of the complexity of the repair, the organization shall consult the manufacturer.

#### **8.1.14 Zippers.**

**8.1.14.1** Replacement zippers shall be installed in a manner consistent with the garment manufacturer's method of construction.

**8.1.14.2** Replacement zippers shall be obtained from the manufacturer or the manufacturer's recognized source.

**8.1.14.3** If unsure of the complexity of the repair, the organization shall consult the manufacturer.

#### **8.1.15 Replacement Hook and Loops.**

**8.1.15.1** Replacement hook and loop fastener tape shall be installed in a manner consistent with the garment manufacturer's method of construction.

**8.1.15.2** Replacement hook and loop shall be obtained from the garment manufacturer or the manufacturer's recognized source.

**8.1.15.3** If unsure of the complexity of the repair, the organization shall consult the manufacturer.

#### **8.1.16 Replacement Reinforcement.**

**8.1.16.1** Replacement reinforcement materials shall be installed in a manner consistent with the garment manufacturer's method of construction.

**8.1.16.2** Replacement reinforcement material shall be obtained from the garment manufacturer or the manufacturer's recognized source.

**8.1.16.3** If unsure of the complexity of the repair, the organization shall consult the manufacturer.

### **8.2 Helmet Repair.**

**8.2.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of helmets and is responsible for performing or managing specialized repairs.

**8.2.2** Helmets shall be cleaned before any repair work is undertaken.

**8.2.3** Where replacement of a helmet component is performed, the replacement component(s) shall be obtained from the helmet manufacturer or the manufacturer's recognized source.

**8.2.4** If there is indication of a crack, dent, abrasion, bubbling, soft spot, discoloration, or warping in the helmet shell, the shell shall be replaced (*see Section 10.1*).

**8.2.5** Small surface nicks and scratches shall be repaired in accordance with the manufacturer's instructions.

### **8.3 Goggle Repair.**

**8.3.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of goggles and is responsible for performing or managing specialized repairs.

**8.3.2** Goggles shall be cleaned before any repair work is undertaken.

**8.3.3** Where replacement of a goggle component is performed, the replacement component(s) shall be obtained from the goggles manufacturer or the manufacturer's recognized source.

**8.3.4** If there is indication of a crack, dent, abrasion, bubbling, soft spot, discoloration, or warping in the goggle, the goggle shall be replaced (*see Section 10.1*).

**8.3.5** Small surface nicks and scratches in the goggle frame or body shall be repaired in accordance with the manufacturer's instructions.

### **8.4 Glove Repair.**

**8.4.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of gloves and is responsible for performing or managing specialized repairs.

**8.4.2** Gloves shall be cleaned before any repair work is undertaken.

**8.4.3** All repairs to gloves shall be done in a manner approved by the manufacturer and using materials approved by the manufacturer.

### **8.5 Footwear Repair.**

**8.5.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of footwear and is responsible for performing or managing specialized repairs.

**8.5.2** Footwear shall be cleaned before any repair work is undertaken.

**8.5.3** All repairs to leather boots other than the replacement of boot laces, insoles, and zipper assemblies shall be performed by the manufacturer or a repair service recognized by the manufacturer.

### **8.6 Face/Neck Shroud Repair.**

**8.6.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in

the repair of face/neck shroud and is responsible for performing or managing specialized repairs.

**8.6.2** Face/neck shrouds shall be cleaned before any repair work is undertaken.

**8.6.3** All repairs to face/neck shrouds shall be done in a manner approved by the manufacturer and using materials approved by the manufacturer.

### **8.7 Chain Saw Leg Protector Repair.**

**8.7.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of chain saw leg protectors and is responsible for performing or managing specialized repairs.

**8.7.2** Chain saw leg protectors shall be cleaned before any repair work is undertaken.

**8.7.3** All repairs to chain saw leg protectors shall be done in a manner approved by the manufacturer and using materials approved by the manufacturer.

### **8.8 Load-Carrying Protective Equipment.**

**8.8.1** All repairs shall be performed by the original manufacturer, by a verified ISP who has received training, or by a member(s) of the organization who has received training in the repair of load-carrying protective equipment and is responsible for performing or managing specialized repairs.

**8.8.2** Load-carrying protective equipment shall be cleaned before any repair work is undertaken.

**8.8.3** All repairs to load-carrying protective equipment shall be done in a manner approved by the manufacturer and using materials approved by the manufacturer.

## **Chapter 9 Storage**

### **9.1 Requirements for All PPE.**

**9.1.1** PPE shall not be stored in or exposed to direct sunlight, indirect sunlight, or fluorescent light while not being worn.

**9.1.2** PPE shall be clean and dry before storage.

**9.1.3** PPE storage areas shall be clean, dry, and well ventilated.

**9.1.4** PPE shall not be stored in airtight containers unless they are new and unissued.

**9.1.5** PPE shall not be stored at temperatures below  $-32^{\circ}\text{C}$  ( $-25^{\circ}\text{F}$ ) or above  $82^{\circ}\text{C}$  ( $180^{\circ}\text{F}$ ).

**9.1.6** PPE shall not be stored or transported in compartments or trunks with sharp objects, tools, or other equipment that could damage the clothing and equipment unless the items are in a protective case or bag to prevent damage.

**9.1.7** PPE shall not be stored in contact with hydraulic fluids, solvents, hydrocarbons, hydrocarbon vapors, or other contaminants.

## **Chapter 10 Retirement, Disposition, and Special Incident Procedure**

### **10.1 Retirement.**

**10.1.1** The organization shall develop specific criteria for removal of PPE from service, including, but not limited to, issues that are specific to the organization, the manufacturer's instructions, and the experience of the organization.

**10.1.2** PPE that is worn or damaged to the extent that the organization deems it not possible or cost effective to repair the PPE shall be destroyed or disposed of in a manner that ensures the PPE will not be used in any firefighting or emergency activities, including training.

**10.1.3** PPE that is contaminated to the extent that the organization deems it not possible or cost effective to decontaminate the PPE shall be destroyed or disposed of in a manner that ensures the PPE will not be used in any firefighting or emergency activities, including training.

**10.1.4** PPE that is no longer of use to the organization for emergency operations service shall be destroyed or disposed of in a manner that ensures it will not be used in any firefighting or emergency activities, including training.

**10.1.5** PPE not in compliance with the edition of the NFPA standard that was current when the PPE was manufactured shall be destroyed or disposed of in a manner that ensures it will not be used in any firefighting or emergency activities, including training.

**10.1.6** The chain saw leg protectors shall be retired when any physical damage results in the pulling out of cut-resistant fabric.

### **10.2 Special Incident Procedure.**

**10.2.1** The organization shall have procedures for the handling and custody of clothing and equipment directly related to serious firefighter injuries and firefighter fatalities.

**10.2.2** In the absence of any other prevailing rules of evidence, the organization's procedures shall include at least the following:

- (1) Provisions shall be in place for the immediate removal from service and preservation of all personal protective clothing and equipment utilized by the injured or deceased firefighter. Custody of such clothing and equipment shall be maintained at a secure location with controlled, documented access.
- (2) All such clothing and equipment shall be nondestructively tagged and stored only in paper or cardboard containers to prevent further degradation or damage. Plastic or airtight containers shall not be used.
- (3) Personal protective clothing and equipment directly related to serious firefighter injuries and firefighter fatalities shall be reviewed by qualified members of the organization or by outside experts to determine the condition thereof.

**10.2.3** The organization shall determine a specific period of time for retaining custody of the personal protective clothing and equipment.



## Chapter 11 Verification

### 11.1 General.

**11.1.1** In order for an organization or ISP to be verified, it shall meet the requirements of this chapter.

**11.1.1.1** Verification of the organization or ISP shall include inspection, cleaning, and repairs of garment elements only and shall not apply to helmets, gloves, footwear, chain saw protectors, or load-carrying equipment.

**11.1.1.2** Where an organization or ISP is verified for conducting repairs, the organization or ISP shall also be verified for cleaning and inspection.

**11.1.1.3** The verified organization or ISP shall be listed.

**11.1.1.3.1** The listing shall specify cleaning, inspection, and/or repairs that the organization or the ISP is verified to conduct.

**11.1.2** All verification of the organization or ISP shall be performed by a certification organization that meets at least the requirements specified in Section 11.2 and that is accredited for PPE in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*.

**11.1.2.1** The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

**11.1.3** The verified organization or verified ISP shall not use the NFPA name or the name or identification of this standard in any statements about its services unless the services are verified as compliant to this standard.

**11.1.3.1** No provider of the services covered by this standard shall claim to be an ISP, a verified ISP, or a verified organization unless they comply with all the requirements in this standard and are third-party verified in accordance with the requirements of this chapter.

### 11.2 Verification Program.

**11.2.1\*** The certification organization shall not be owned or controlled by the organization or the ISP being verified.

**11.2.2** The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the organization's or ISP's ultimate profitability.

**11.2.3** The certification organization shall be accredited for PPE in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*.

**11.2.3.1** The accreditation shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

**11.2.4** The certification organization shall refuse to verify services to this standard that do not comply with all applicable requirements of this standard.

**11.2.5\*** The contractual provisions between the certification organization and the organization or the ISP shall specify that verification is contingent on compliance with all applicable requirements of this standard.

**11.2.6** The certification organization shall not offer or confer any conditional or temporary verification.

**11.2.7\*** The certification organization shall have laboratory facilities and equipment available for conducting proper tests to determine organization or ISP compliance.

**11.2.8** The certification organization's 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.

**11.2.9** The certification organization's 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.

**11.2.10** The certification organization shall require the organization or ISP to establish and maintain a quality management program that meets the requirements of Section 11.4.

**11.2.11** The certification organization and the organization or ISP shall evaluate any changes affecting function of the compliant services to determine continued certification to this standard.

**11.2.12\*** The certification organization shall have a follow-up inspection program of the organization's or ISP's facilities of the compliant services with at least one random and unannounced visit per 12-month period to verify continued compliance.

**11.2.13** The certification organization shall be permitted to conduct specific testing to verify continued compliance.

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

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

### 11.3 Inspection and Testing.

**11.3.1** For verification of the organization's or ISP's services, the certification organization shall conduct both inspection and testing as specified in this section.

**11.3.2** All inspections, evaluations, conditioning, and testing for verification of the organization or ISP 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*.

**11.3.3** 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 PPE.

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

**11.3.5** A certification organization shall be permitted to utilize conditioning and testing results conducted by an organization or an ISP for verification provided the organization or the ISP testing laboratory meets the requirements specified in 11.3.5.1 through 11.3.5.5.

**11.3.5.1** Where an organization or an ISP provides conditioning and testing results to the certification organization, the organization's or ISP's testing laboratory shall be accredited in accordance with the requirements of ISO 17025, *General requirements for the competence of testing and calibration laboratories*.

**11.3.5.2** The organization or ISP testing laboratory's scope of accreditation to ISO 17025, *General requirements for the competence of testing and calibration laboratories*, shall encompass testing of PPE.

**11.3.5.3** The accreditation of an organization's or ISP's testing laboratory shall be issued by an accreditation body operating in accordance with ISO 17011, *Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*.

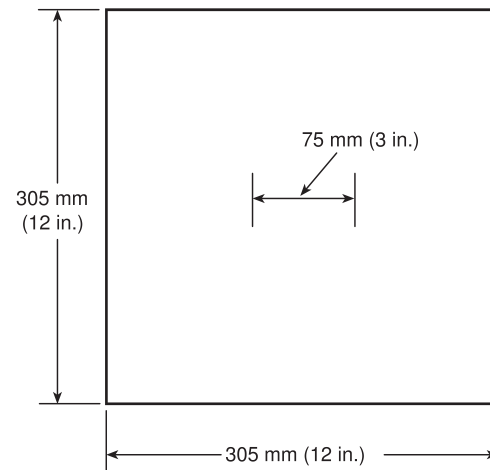
**11.3.5.4** The certification organization shall also approve the organization's or ISP's testing laboratory.

**11.3.5.5** The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for verification conducted at the organization's or ISP's testing laboratory.

**11.3.6** Sampling levels for testing and inspection shall be established by the certification organization and by the organization or ISP to ensure reasonable and acceptable reliability at a reasonable and acceptable confidence level that repair services are compliant to this standard, unless such sampling levels are specified herein.

**11.3.7** For verification of an organization's or ISP's cleaning services, the certification organization shall evaluate the organization's or ISP's procedures in accordance with Section 7.2 .

**11.3.8** For verification of an organization's or ISP's repair services, the series of tests outlined in Table 11.3.8 shall be



**FIGURE 11.3.8.2 Tear Repairs.**

required to be conducted using new materials as described in the table.

**11.3.8.1** Initial samples submitted by the organization or ISP for verification shall be permitted to be prepared by that organization or ISP.

**11.3.8.2** For repairs to tears in the garment material the certification organization shall inspect the tear in the material(s) to be repaired in accordance with Figure 11.3.8.2 and shall witness the repair of the samples to be tested.

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

**Table 11.3.8 Garment Repairs**

| Repairer     | Sample                     | Material   | Test or Evaluation       |
|--------------|----------------------------|--|--------------------------|
| Organization | 5 ft (1.5 m) felled seam   | Garment material(s) utilized by the organization   | See 7.1.9 in NFPA 1977.  |
|              | 5 ft (1.5 m) overedge seam |  |                          |
|              | Small tear patch           | Patched tear made from the garment material utilized by the organization   | See 8.1.11 in NFPA 1877. |
| ISP          | 5 ft (1.5 m) felled seam   | 255 g/m <sup>2</sup> (7.5 oz/yd <sup>2</sup> ) plain weave fabric of 93 percent dyeable, low crystallinity meta-aramid/5 percent para-aramid/2 percent inductive antistatic fiber                        | See 7.1.9 in NFPA 1977.  |
|              | 5 ft (1.5 m) overedge seam |  |                          |
|              | Small tear patch           | Patched tear made from 255 g/m <sup>2</sup> (7.5 oz/yd <sup>2</sup> ) plain weave fabric of 93 percent dyeable, low crystallinity meta-aramid/5 percent para-aramid/2 percent inductive antistatic fiber | See 8.1.11 in NFPA 1877. |

**11.3.9** The organization or ISP shall maintain all inspection and test data from the certification organization used in the verification of the organization's or ISP's services. The organization or ISP shall provide such data, upon request, to the purchaser or authority having jurisdiction.

**11.3.10** Where an ISP or organization is verified for repair, the ISP or organization shall undergo verification on an annual basis.

#### **11.4 Organization or ISP Quality Management Program.**

**11.4.1** The organization's or ISP's management shall define and document its policy and objectives for and commitment to quality and shall ensure that this policy is understood, implemented, and maintained at all levels in the organization or ISP.

**11.4.2** The organization or ISP shall operate an effective quality system appropriate to the type, range, and volume of work performed.

**11.4.3** The management of the organization or ISP shall designate a person who, irrespective of other duties, shall have defined authority and responsibility for quality assurance within the organization or ISP. The quality system shall be maintained relevant and current under the responsibility of the same person.

**11.4.4** The quality system shall be fully documented. There shall be a Quality Manual, which shall contain at least the following information:

- (1) General information regarding the organization (names, addresses, phone numbers, and legal status)
- (2) Management statement on the organization's or ISP's policy on, objectives for, and commitment to quality
- (3) Management statement assigning a responsible person for quality assurance
- (4) Description of the organization's or ISP's areas of activity and competence
- (5) Organization chart(s)
- (6) Relevant job descriptions
- (7) Policy statement on qualifications and training of personnel
- (8) Procedures for control of documents
- (9) Procedures for internal audits
- (10) Procedures for feedback and corrective action
- (11) Procedures for management review of the quality system
- (12) Distribution list for the Quality Manual
- (13) Work instructions or process manuals
- (14) Procedure for handling returns and complaints

**11.4.5** The organization or ISP shall maintain a system for control of all documentation relating to its activities and shall ensure that the following occur:

- (1) The current revisions of the appropriate documentation are available at all relevant locations and to all relevant staff.
- (2) All amendments to documents are authorized and processed in a manner that ensures timely availability at the appropriate locations.
- (3) Superseded documents are removed from use throughout the organization, but one copy is filed for a determined period.
- (4) Other parties, as necessary, are notified of changes.

**11.4.6** The organization or ISP shall carry out a system of planned and documented internal quality audits to verify

compliance with the criteria of this standard and the effectiveness of the quality system. The personnel performing the audits shall be suitably qualified for and independent of the functions being audited.

**11.4.7** The organization or ISP shall have documented procedures for dealing with feedback and corrective action whenever discrepancies are detected in the quality system or in the performance of inspections.

**11.4.8** The management of the organization or ISP shall review the quality system at least annually to ensure its continuing suitability and effectiveness. The results of such reviews shall be recorded.

#### **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.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.** 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.3.3.35 Verified Organization.** A verified organization can be a fire department or an AHJ trained by a manufacturer(s) and verified by a third-party certifier.

**A.4.1.1** NFPA 1500 and NFPA 1581 also provide requirements and information on cleaning and decontamination. PPE are important tools that enable firefighters to perform their jobs in



a safe and effective manner. Organizations need to recognize that these items do not have an indefinite life span and that regular inspections are a necessary part of any protective equipment program.

**A.4.2.3** Emergency response organizations are cautioned that base-layer garments could degrade the protection or performance of the certified clothing or equipment; interfere with form, fit, or function of the certified clothing or equipment; or become a hazard to the wearer. Base-layer garments are not part of the certified clothing but could be worn under certified clothing by means not engineered, manufactured, or authorized by the clothing manufacturer. Additionally, if the base-layer garments are not designed and manufactured from suitable materials for the hazardous environments of emergency incidents, the failure of the base-layer garments could cause injury to the wearer. If a base-layer garment causes the structural integrity of the certified clothing to be compromised, the certified clothing might not be compliant with the standard by which it was originally certified.

Organizations should consider evaluating the ensemble with tests provided in NFPA 1977 to determine whether the base-layer garment(s) might negatively impact performance. Additional tests not included in NFPA 1977 that could be used to evaluate the performance of base-layer garments, such as those in the following two documents, should be considered.

ASTM F1930, *Standard Test Method for Evaluation of Flame Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin*, provides for a simulation of a flash fire exposure using a static manikin. The effects of flash fire on the base-layer garments can be determined and compared to an ensemble that does not have the base-layer garment in place. A minimum exposure time of 10 seconds is recommended for evaluating wildland protective clothing and equipment.

ASTM F2370, *Standard Test Method for Measuring the Evaporative Resistance of Clothing Using a Sweating Manikin*, provides for a simulation of the evaporative heat loss using a static manikin. The effects of heat loss on the base-layer garments can be determined and compared to an ensemble that does not have the base-layer garments in place. A minimum exposure time of 10 seconds is recommended for evaluating wildland protective clothing and equipment.

While these ASTM tests provide demonstrations of base-layer garments under emergency conditions, they do not simulate all fire ground hazards. Other evaluations should also be considered.

**A.4.2.5** A manufacturer-trained organization receives training from an element manufacturer or a verified ISP in cleaning, inspection, and repair services for that organization's own clothing and equipment. For garment elements, this entity has not received any formal verification from a third-party certification organization. If an organization has received training in cleaning, inspection, and repair of elements, it can be permitted to utilize another organization's equipment to conduct cleaning, inspection, or repair. For example, if Organization A purchases a washer/extractor and neighboring Organization B wishes to utilize this washer/extractor, it is permissible to do so; however, Organization B must use its trained personnel to conduct the laundering. If Organization B wishes to use Organization A's equipment and personnel to conduct the laundering, then Organization A must be a verified organization [see 4.2.5(2)].

A verified organization has demonstrated the ability to conduct cleaning, inspection, and repairs to a third-party certification organization in accordance with this standard and is not required to have the approval of the element manufacturer to perform these services. Verified organizations are permitted to conduct these services for other organizations.

A verified ISP has demonstrated the ability to conduct cleaning, inspection, and repairs to a third-party certification organization in accordance with this standard and is not required to have the approval of the element manufacturer to perform these services.

**A.4.2.5.2** Although approval from a manufacturer is not a requirement of this standard, it might be advantageous for the specific clothing or equipment manufacturer to be consulted when there is any question concerning the appropriate cleaning, inspection, or repair of specific clothing or equipment. NFPA 1977 requires that every certified element contain the name and address of the clothing or equipment manufacturer so this information is readily available and each manufacturer will be able to offer the best possible practical knowledge of its product.

**A.4.2.5.3** The end user should always request documentation of the services for which the verified ISP is approved to perform.

**A.5.1.1** A committee should be established to oversee the process of selection. This committee should consist of interested individuals representing a cross section of the organization (e.g., from both labor and management) who collectively have several years of experience in wildland firefighting activities. The role of the committee will be to set and define goals and requirements for the wildland firefighting PPE, including compliance with NFPA 1977; to identify areas of responsibility for each member; and to provide recommendations to the authority having jurisdiction. The following list outlines the tasks the committee should undertake:

- (1) *Evaluate.* The committee should evaluate the suitability and performance of current products based on the organization's needs, field performance, and safety results. Evaluation can include the following:
  - (a) Types of work activity
  - (b) Types of injuries sustained
  - (c) Wear life and replacement cycles
  - (d) Cost
  - (e) Support and service of manufacturer or vendor
  - (f) Satisfaction level of personnel
  - (g) Conformance to latest edition of applicable standards and regulations
- (2) *Gather Information.* Seek sources of information such as product information, test results, trade shows, seminars, and/or other pertinent references.
- (3) *Examine.* Examine and review literature and evaluate samples.
- (4) *Contact Manufacturers.* Contact manufacturers or vendors who offer products that meet the organization's criteria.
- (5) *Ask for Samples.* Ask for samples or demonstrations of products of interest. Verify that the bid PPE items work properly with existing PPE items already in service.
- (6) *Conduct Field Evaluations.* Where practical, the organization may want to conduct field evaluations to help evaluate products.
- (7) *Design.* Design a systematic evaluation procedure:

- (a) Select field evaluation participants based on a cross section of personnel, willingness to participate, objectivity, and level of activity.
  - (b) Determine the “control” product (the item against which the new PPE will be evaluated), normally the existing product.
  - (c) Develop a product evaluation form, which should include general performance criteria as well as specific items relevant to the organization.
  - (d) Different combinations of individual products should be worn for evaluation to determine if each item of PPE is compatible with the other items. For example, wear gloves when evaluating the dexterity necessary to adjust or use other PPE.
- (8) *Obtain Products and Begin Testing.* If multiple products are being tested, all field evaluation participants should wear-test each product. Check with manufacturers or vendors about wear-test programs.
- (9) *Solicit Evaluations from Participants.* At least three evaluations should be completed: the first within one week of starting the tests, another halfway through the trial, and the last at the end of the trial.

**A.5.1.7(4)** The following ASTM standards are included as reference to the means by which PPE should be sized to the individual:

- (1) ASTM D5219, *Standard Terminology Relating to Body Dimensions for Apparel Sizing*
- (2) ASTM D6240/D6240M, *Standard Tables of Body Measurements for Mature Men, Ages 35 and Older, Sizes Thirty-Four to Fifty-Two (34 to 52) Short, Regular, and Tall*
- (3) ASTM D6960/D6960M, *Standard Tables for Body Measurements for Plus Women’s Figure Type, Size Range 14W–20W*
- (4) ASTM D7878/D7878M, *Standard Tables for Body Measurements for Adult Female Misses Petite Figure Type, Size Range 00P–20P*

**A.5.1.11** When developing specifications, solicit help from other organizations and manufacturers. Use NFPA 1977 as a minimum requirement for purchase specifications. If more stringent requirements are necessary or desired, state them along with applicable test criteria.

If specific performance or design criteria are desired, include them in the specification. In general, performance requirements are preferred, since they do not limit innovation.

Be sure specifications are not redundant or contradictory and can be met by a PPE manufacturer. Specifications should be detailed enough to allow effective evaluation of PPE when it is delivered. Include provisions for returning unsatisfactory products if specifications are not met and specify delivery time requirements.

**A.5.1.12** Increase purchasing power potential by combining purchases with other organizations to take advantage of possible volume discounts.

A pre-bid meeting with participation of potential bidders is useful in eliminating inconsistencies or clarifying requirements.

**A.5.1.13** Examine information supplied with the products such as instructions, warranties, and technical data. Look for completeness of the information and its ease of use.

Review the manufacturer’s or vendor’s record of meeting delivery dates, repair turn-around times, and similar customer service issues.

**A.5.1.15** Besides inspecting PPE to ensure that it meets purchase specifications, the following actions should be taken:

- (1) Verify quantity and sizes of PPE received.
- (2) Check for damage that might have occurred during shipment.
- (3) Examine information supplied with the products such as instructions, warranties, and technical data.
- (4) Ensure that all user information reaches the end user.
- (5) Verify proper fit of PPE to the individual when the PPE is placed into service.

**A.5.2** NFPA 1977 defines the requirements for wildland firefighting protective garments, cold weather outerwear and face/neck shrouds. Wildland firefighting protective garments are generally a single layer and can be configured as trousers and a shirt or jacket or as a one-piece protective garment worn to protect the upper torso and lower body. Cold weather outerwear are of heavier material and can be insulated and are intended to provide protection and keep the firefighter warm. Face/neck shrouds are generally a single layer that attaches to the helmet and are worn to protect the face and neck area.

**A.5.2.1** Undergarment materials that melt or shrink at elevated temperatures should be avoided, because they could potentially adhere to the skin and add to the severity of burns.

The use of t-shirts under flame resistant garments can help prevent chafing.

Undergarments with the capacity to absorb a high percentage of moisture and transport it away from the body can aid in cooling.

Underlayers can provide some additional insulation against external heat sources. However, when large areas of the body are covered by undergarments (e.g., through the use of long-sleeved t-shirts or liners, or double-layer trousers), cooling could be compromised, making heat stress more likely.

**A.6.1** A systematic and routine top-to-bottom inspection should be made on all PPE. Inspection programs serve two primary purposes: (1) To help ensure that the firefighter’s PPE will provide its designed protection, and (2) to provide a means to document the service and wear life characteristics of the organization’s PPE. This information is vital in determining the causes (and prevention) of premature PPE failures and is useful in developing budgetary justifications.

Damaged PPE should be immediately removed from use and replaced with serviceable equipment. The decision to repair or retire the damaged PPE should be made by trained personnel. Repaired PPE should be thoroughly inspected before it is returned to service.

*Suggested Inspection Grading Scale.* The grading scale is designed to assist organizations identifying and documenting the condition of all PPE. It also helps in evaluating the overall condition of the equipment. A comment is used to note that a specific item of PPE might require repair even though the general condition is acceptable. Grade definitions are as follows:

- (1) *New or As-New Condition.* Newly purchased equipment or equipment that is in like-new condition.

- (2) *Good Condition.* Equipment is in good serviceable condition. The equipment may show wear but replacement is not necessary.
- (3) *Immediate Replacement.* Equipment is unsafe and should be removed from service. After further inspection by trained personnel, PPE may be repaired and returned to service or PPE may be retired.
- (4) *Maintenance Needed.* Maintenance details should be described in the “comments” section of the inspection form.

*Suggested Inspection Criteria.* Every article of PPE should be inspected for the following types of wear or damage. After cleaning, PPE should be inspected again to ensure proper detection of damage such as discoloration or heat damage that would be masked by soiling. Each of the following damage types indicate a potential problem with the protective features of the PPE:

- (1) *Cleanliness.* Soiled PPE should be regularly cleaned and restored to “good” condition. Excessive soiling can compromise the performance of the PPE.
- (2) *Heat Damage.* Charred or burned areas indicate excessive exposure to heat or flame impingement. Such areas are damaged and indicate that the item might need to be repaired or replaced.
- (3) *Fabric or Material Damage.* This type of damage, as evidenced by rips, tears, cuts, worn areas, fraying, weak or easily torn areas, has many possible causes and can often be repaired. To check for fabric strength and integrity, bend or fold the fabric, then attempt to tear it and to push a finger or thumb through the material. The extent and complexity of damage will determine the appropriate follow-up action.
- (4) *Discoloration.* Discoloration can indicate many types of possible damage, including dye loss, frosting (white streaks), heat degradation, ultraviolet (UV) damage, and chemical contamination, among others. These areas should be thoroughly checked for strength and integrity. Any loss of strength or weakening of the material(s) is a sign of damage and grounds for removal of the PPE from service for repair or retirement.
- (5) *Thread or Seam Damage.* This type of damage is evidenced by skipped, broken, or missing stitches. All PPE should be regularly checked for any type of skipped, broken, or missing stitches, which can indicate seam failure.

**A.6.1.3** It is not the intent of this standard to require the cleaning of clothing and equipment if the clothing and equipment is not soiled. The organization should establish guidelines for judging the extent of soiling that requires cleaning based on the organization’s experience. In applying such judgment, the organization should take into consideration the importance of keeping clothing and equipment clean. Soiled clothing and equipment can pose a health risk to the wearer and/or degrade the level of performance.

**A.7.1** The importance of maintaining the cleanliness of wildland and urban interface PPE should not be underestimated. Studies have shown that soiled or contaminated wildland and urban interface PPE are a hazard to firefighters because soils and contaminants can be flammable, toxic, or carcinogenic. Additionally, soils or contaminants can reduce the protective performance of wildland and urban interface PPE. Clean wildland and urban interface PPE can last longer and offer the emergency responders better protection. Wildland and urban interface PPE should be cleaned whenever they become soiled.

In everyday use, PPE becomes dirty by absorbing sweat from the wearer and soils, soot, and so forth from the outside environment. Cleaning of wildland and urban interface PPE removes those substances. Wildland and urban interface PPE can also become contaminated with other substances, principally hazardous materials, particulates, and body fluids. The removal of these substances is most often referred to by the term *decontamination*. In wildland and urban interface PPE, both general cleaning and decontamination of PPE are often necessary.

*Health risks of soiled or contaminated wildland and urban interface PPE.* Soiled or contaminated wildland and urban interface PPE can expose firefighters to toxins, carcinogens, and other harmful substances that enter the body through ingestion, inhalation, or skin absorption. Repeated small exposures to some contaminants can accumulate within the body over time and cause health problems.

Although great emphasis is placed on safety to avoid injury or inhalation hazards to personnel working on the fireground, many of the contaminants that lead to health risks are being carried away from the fire scene on PPE used by the firefighter. Wildland and urban interface fires are increasingly being identified as sources for contamination by products of combustion that are known to include various toxic and carcinogenic chemicals.

Contaminants that a firefighter could come into contact with can be trapped in the fibers of soiled wildland and urban interface PPE or absorbed into the materials themselves. Contact with soiled wildland and urban interface PPE can also increase the risk of hazardous contaminants being introduced into the body through either skin absorption or from contaminants off-gassing into the immediate atmosphere breathed by firefighters.

PPE contaminated with body fluids present a potential risk of infectious diseases being transmitted to the person coming into contact with the PPE.

Other forms of contaminants include substances such as bulk chemicals, asbestos, and other hazardous substances encountered at the emergency scene.

*Reduced performance hazards of wildland and urban interface PPE.* When wildland and urban interface PPE becomes laden with particles and chemicals, other problems are faced in addition to being exposed to toxins, such as the following:

- (1) Wildland and urban interface PPE typically reflects less radiant heat. After materials are saturated with hydrocarbons, they will tend to absorb rather than reflect the radiant heat from the surrounding fire.
- (2) Wildland and urban interface PPE that is heavily contaminated with hydrocarbons are more likely to conduct electricity, increasing the danger when entering a building or vehicle where wiring can still be live.
- (3) Wildland and urban interface PPE impregnated with oil, grease, and hydrocarbon deposits from soot and smoke can ignite and cause severe burns and injuries, even if the materials are normally flame-resistant.

Even though the number of specialized hazardous materials response teams is growing, individual firefighters can still encounter various chemicals in their normal firefighting activities. Exposures to oils, gasoline, and lubricants can occur around fire station vehicles. During responses, exposures to



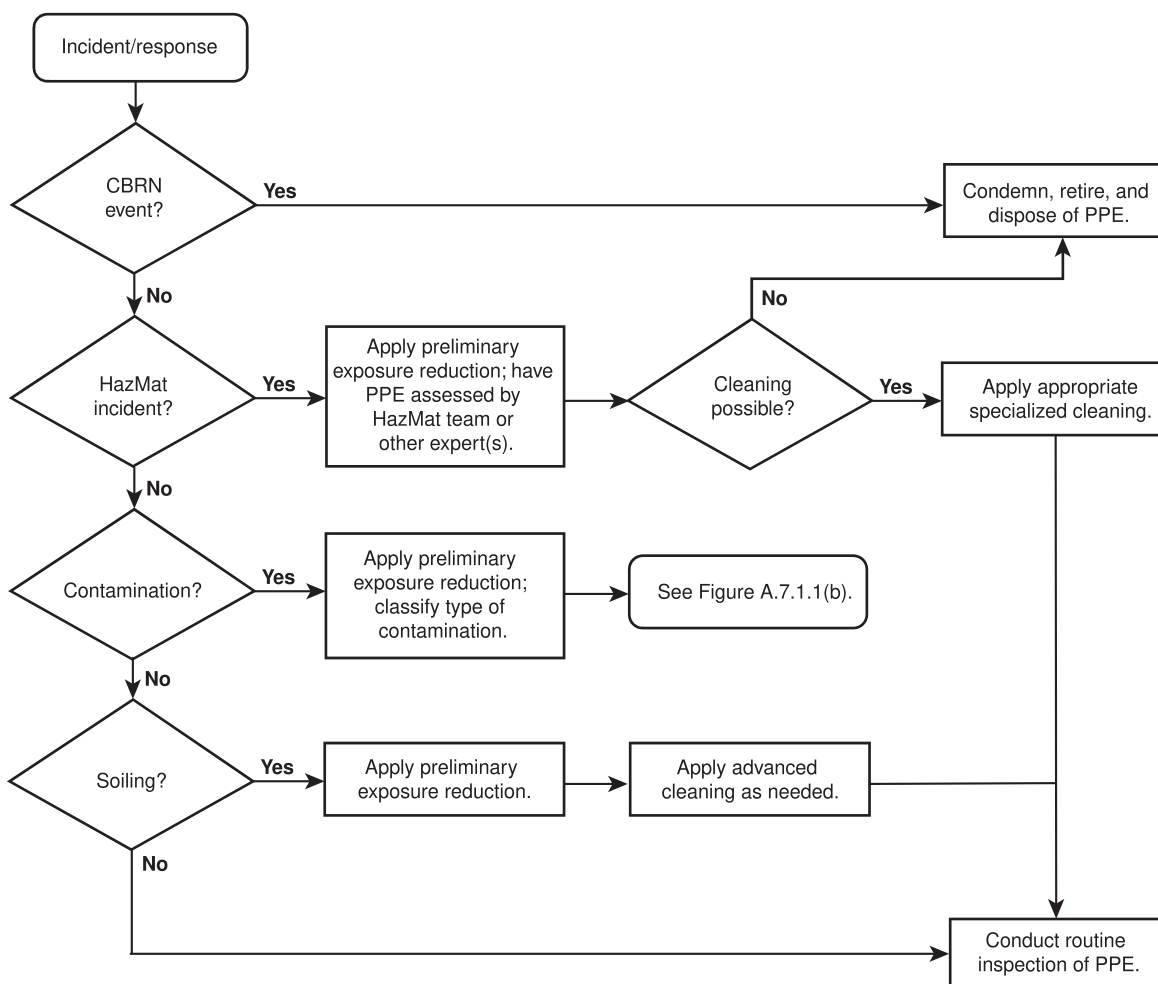
liquids ranging from pesticides to acids to chemical solvents can occur, knowingly or unknowingly. These contaminants, in addition to being hazardous, can also degrade wildland and urban interface PPE as follows:

- (1) Fabrics and materials can become weakened and tear more easily.
- (2) Thread or seam sealing tape can become loose.
- (3) Water-repelling treatments can be removed.
- (4) Visibility markings can lose reflective properties or markings, becoming less visible.
- (5) Helmet shells, helmet faceshields, or goggles can pit or craze.
- (6) Wildland and urban interface PPE hardware can become corroded.

**A.7.1.1** Because wildland firefighters can be required to work for multiple days wearing the same garments, they might either

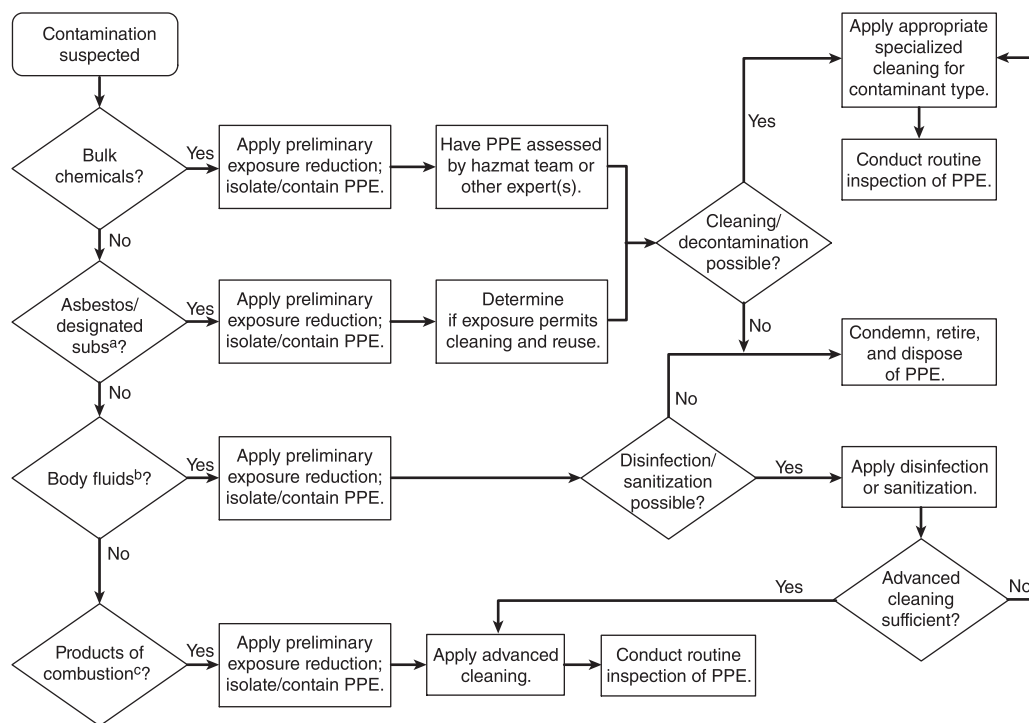
clean their garments or exchange the soiled garments for clean garments during a rest period. When firefighters are unable to either clean their soiled garments or trade in soiled garments for clean garments, they can be required to pack out the soiled garments until another opportunity (to clean or trade in) is available. In some cases, the actual cleaning of garments can be done by a cleaning facility at the field command staging area. In other cases, cleaning might be delayed until firefighters return to their home base.

Organizations can use the decision tool shown in Figure A.7.1.1(a) and Figure A.7.1.1(b) to assist in determining the appropriate cleaning procedures.



Note: Contaminants shown in relative hierarchy of exposure risk. Multiple forms of contamination might apply. Clean according to highest risk.

**FIGURE A.7.1.1(a) Approach for Deciding Handling, Cleaning, and Disposition of Protective Clothing and Equipment.**  
[1851:Figure 7.1.1.2(a)]



Notes:

<sup>a</sup>And other designated substances

<sup>b</sup>Includes other microbial contamination

<sup>c</sup>Includes any significant structural fire exposure

**FIGURE A.7.1.1(b) Approach for Addressing Specific Types of Contamination. [1851:Figure 7.1.1.2(b)]**

**A.7.1.5** Before PPE is cleaned or decontaminated by the contracted cleaning service, the following questions should be asked to determine if the contracted cleaning service is knowledgeable enough to provide adequate service and not cause damage to the items:

- (1) Can the items be effectively cleaned or decontaminated? (See A.7.1.1.)
- (2) Does the contracted cleaning service have references for cleaning and/or decontamination of ensembles and ensemble elements?
- (3) Does the contracted cleaning service have liability insurance to clean protective clothing (e.g., for the repair or replacement of ensembles and ensemble elements damaged in laundry from wash water contamination)?
- (4) Does the contracted cleaning service take reasonable precautions to protect its personnel from contaminant exposure while handling ensembles and ensemble elements?
- (5) Is the contracted cleaning service familiar with the requirements of NFPA 1977?
- (6) Does the contracted cleaning service have a quality assurance program?
- (7) What type of process does the contracted cleaning service use? Are SDSs available? If the process is proprietary, is it approved by the manufacturer of the ensemble or ensemble element?
- (8) Does the contracted cleaning service take appropriate steps to prevent cross-contamination between any and all products laundered in the facility?

- (9) How does the contracted cleaning service demonstrate the effectiveness of the cleaning process?
- (10) What testing or evaluation method(s) is used to ensure that decontaminated ensembles or ensemble elements are truly decontaminated and safe to wear?
- (11) Does the contracted cleaning service comply with applicable federal, state, and local wastewater discharge regulations and standards?
- (12) Does the contracted cleaning service provide delivery and pickup services for soiled and/or contaminated ensembles and ensemble elements?
- (13) What is the turnaround time?

**A.7.2.1** Soiling reduces the effectiveness of the PPE. As materials absorb the by-products of vegetation combustion, they tend to absorb greater amounts of radiant heat than does new or clean material. Frequent and appropriate cleaning can return the PPE to its intended protection levels. Garments that have been soiled by petrochemicals should be presoaked before being placed in a washer and should be washed separately.

**A.7.2.2.2** Home laundering technology might provide sufficient cleaning of certain soils, and this requirement does not prohibit the use of home laundering technology outside a residential/consumer application, when such equipment is used only for PPE. It is imperative that soiled or contaminated PPE is never laundered in the same machine as general clothing, regardless of laundering technology.

**A.7.2.2.4** Machine washing is the most effective means of loosening, reducing, and removing dirt, soot, and other debris. It is

recommended that only front-loading machines without agitators be used. Top-loading machines have the potential to reduce the longevity of the garment due to mechanical damage.

The effluent from washing machines must be properly disposed of according to federal, state, and local regulations and guidelines. Failure to follow regulations can result in fines and/or other forms of punitive damages.

*Guidelines for Machine Cleaning of Garments.* These guidelines should be followed for the machine cleaning of garments:

- (1) Follow the manufacturer's instructions for front-loading machines. Do not overload the machine.
- (2) Pretreat heavily soiled and spotted areas of the garment, if necessary, then soak the garments per the manufacturer's instructions.
- (3) If necessary, scrub the garment gently using a soft bristle brush.
- (4) Fasten all closures, including pocket closures, hooks and loops, and zippers.
- (5) Turn garments with retroreflective trim inside out.
- (6) Wash and dry the garments according to the manufacturer's instructions.
- (7) Water temperature should not exceed 105°F (40°C).

*Guidelines for Drying of Garments.* Drying garments in ambient air can take a considerable length of time, depending on the ambient environmental conditions. The use of racks that provide maximum air exposure of the garments will decrease the overall drying time. Exposure to direct sunlight, indirect sunlight, and fluorescent light should be avoided due to the potential damage to the fabric.

If the garments are being machine dried, the stack temperature should not exceed 140°F (60°C). All closures should be fastened and the garments turned inside out.

**A.7.2.3** The following questions can assist an organization to determine if a contract cleaner is knowledgeable enough to provide adequate service and not damage wildland firefighting PPE.

- (1) Does the contract cleaner have references for cleaning PPE?
- (2) Does the contract cleaner have adequate liability insurance to pay for replacement of PPE damaged while in their possession?
- (3) Does the contract cleaner use procedures that do not compromise the performance of the PPE?
- (4) Does the contract cleaner take reasonable precautions for preventing exposure of workers who handle PPE?
- (5) Is the contract cleaner familiar with the requirements of state and federal OSHA regulations?
- (6) Does the contract cleaner use an adequate tracking, tagging, or recording system?
- (7) What type of process does the contract cleaner use? Are safety data sheets (SDS) available? If the process is proprietary, is it approved by garment manufacturers?

- (8) Does the contract cleaner take appropriate steps to prevent cross contamination between any and all products laundered in the facility?
- (9) Does the contract cleaner comply with applicable local, state, and/or federal waste water discharge regulations and standards?
- (10) Does the contract cleaner provide delivery and pick-up services of the soiled and/or contaminated garments?
- (11) How does the contract cleaner demonstrate the effectiveness of the cleaning process?
- (12) What is the turn-around time provided by the contract cleaner?

**A.7.4.3** Using water or detergent on a fog-free treated lens could remove the fog-free coating. More thorough cleaning of the body and attachments can be done with the lens removed.

**A.7.9.5** Excessive soiling by chain saw fuel and bar oil reduces the protective qualities of leg protectors and increases their flammability.

**A.8.1.8** Major seams are critical to the integrity of the garment.

**A.11.2.1** The certification organization should have a sufficient breadth of interest and activity so that the loss or award of a specific business contract would not be a determining factor in the financial well-being of the agency.

**A.11.2.5** The contractual provisions covering verification programs should contain clauses advising the verified organization or verified ISP that, if requirements change, the process should be brought into compliance with the new requirements by a stated effective date through a compliance review program involving all currently verified repairs. Without such clauses, certification organizations would not be able to move quickly to protect their names, marks, or reputations. A verification program would be deficient without these contractual provisions and the administrative means to back them up.

**A.11.2.7** Investigative procedures are important elements of an effective and meaningful verification program. A preliminary review should be carried out on processes submitted to the agency before any major testing is undertaken.

**A.11.2.12** Such inspections should include the witnessing of cleaning, inspections, and repairs and a review of the quality management system.

## Annex B Sample Forms

*This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.*

**B.1** Figure B.1(a) through Figure B.1(g) are sample inspection forms for PPE.

### INSPECTION FORM: GARMENTS

Item: \_\_\_\_\_

Lot Number: \_\_\_\_\_

Name: \_\_\_\_\_

Inspector: \_\_\_\_\_

Station: \_\_\_\_\_ Shift: \_\_\_\_\_

Date: \_\_\_\_\_

 Item Description: ☐ Shirt      ☐ Trouser      ☐ One-Piece      ☐ Face/Neck Shroud      ☐ Other

Item I.D. Number: \_\_\_\_\_

| GARMENTS                                   | New | Good | Replace | Comments |
|--|-----|------|---------|----------|
| Cleanliness                                |     |      |         |          |
| Char or heat damage                        |     |      |         |          |
| Discoloration (check strength)<br>dye loss |     |      |         |          |
| Fabric or material damage                  |     |      |         |          |
| Buttons                                    |     |      |         |          |
| Zippers                                    |     |      |         |          |
| Thread or seam damage                      |     |      |         |          |
| Damage to pockets                          |     |      |         |          |
| Hook and loop closures                     |     |      |         |          |
| <b>FACE/NECK SHROUDS</b>                   |     |      |         |          |
| Cleanliness                                |     |      |         |          |
| Char or heat damage                        |     |      |         |          |
| Discoloration (check strength)<br>dye loss |     |      |         |          |
| Fabric or material damage                  |     |      |         |          |
| Hook and loop closures                     |     |      |         |          |

**FIGURE B.1(a) Sample Inspection Form for Garments.**



### INSPECTION FORM: HELMETS

Item: \_\_\_\_\_

Lot Number: \_\_\_\_\_

Name: \_\_\_\_\_

Inspector: \_\_\_\_\_

Station: \_\_\_\_\_

Shift: \_\_\_\_\_

Date: \_\_\_\_\_

| <b>WILDLAND FIRE-FIGHTING<br/>HELMETS</b>      | <b>New</b> | <b>Good</b> | <b>Replace</b> | <b>Comments</b> |
|--|------------|-------------|----------------|-----------------|
| <b>Overall</b>                                 |            |             |                |                 |
| Char or heat damage                            |            |             |                |                 |
| Discoloration                                  |            |             |                |                 |
| Fabric or material damage                      |            |             |                |                 |
| <b>Shell</b>                                   |            |             |                |                 |
| Scorching or deformation                       |            |             |                |                 |
| Delamination                                   |            |             |                |                 |
| Dents, cracks, nicks, gouges                   |            |             |                |                 |
| Loss of surface gloss or flaking               |            |             |                |                 |
| <b>Suspensions</b> (crown straps and headband) |            |             |                |                 |
| Cracked or missing suspension components       |            |             |                |                 |
| Torn head band or size adjustment slots        |            |             |                |                 |
| Stripped adjustment ratchet knobs              |            |             |                |                 |
| Reduced pliability and other signs of wear     |            |             |                |                 |
| Broken stitching                               |            |             |                |                 |
| Improper installation                          |            |             |                |                 |
| <b>Retroreflective Marking</b>                 |            |             |                |                 |
| Clean and retroreflective                      |            |             |                |                 |
| Firmly adhered to shell                        |            |             |                |                 |
| <b>Chin Strap</b>                              |            |             |                |                 |
| Functionality of fasteners/slides              |            |             |                |                 |
| Torn or unraveled fabric                       |            |             |                |                 |
| Broken stitching                               |            |             |                |                 |

**FIGURE B.1(b) Sample Inspection Form for Helmets.**