

# PROTECTIVE GARMENTS

FOR TECHNICAL RESCUE INCIDENTS, EMERGENCY MEDICAL OPERATIONS, AND  
WILDLAND/URBAN INTERFACE FIREFIGHTING

2025



## Official User Information Guide

### DANGER

- *Do not use your Protective Garments until you have read and understood all labels on your Protective Garments and this Official User Information Guide.*
- *If attached, only end user shall separate this guide from the garment. Remove guide from the garment (if attached) prior to using the garment for emergency operations.*

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Fire and Emergency Manufacturers and  
Services Association, Inc.

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# Official User Information Guide

**Protective Garments for Technical Rescue  
Incidents, Emergency Medical Operations,  
and Wildland/Urban Interface Firefighting**

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#S2000RH

2026 Edition

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# Chapter 1

## Introduction



### DANGER

**Emergency operations including technical rescue incidents, emergency medical operations, and wildland/urban interface firefighting are ultra-hazardous and unavoidably dangerous activities. Lack of proper training may lead to death, burns, injuries, diseases, and illnesses. To reduce your risk, do not use your garments as part of your protective ensemble until you have read this guide, all manufacturer's instructions, and have been thoroughly trained by your fire department or employer in firefighting tactics, safety procedures and the proper use of your protective ensemble.**

This FEMSA Official User Information Guide provides warnings, information and instructions related to the selection, care and maintenance of your protective garments designed for (1) technical rescue incidents, (2) emergency medical operations, and (3) wildland and urban interface firefighting. Where a part of this guide specifically provides unique information on one type of garment for a specific type of emergency response operation or activity that is not identified for a particular mission type, the narrative text is background highlighted in gray. While this guide addresses some aspects of use, it does not in any way cover tactics for firefighting or emergency operations. To use this guide effectively, you must thoroughly understand its contents and the information provided on the garment product label. Proper training and supervision for use of personal protective equipment (PPE) in emergency operations and firefighting is critical to your safety. Contact your supervisor immediately if you are unsure about any aspect related to the selection, use, care, and maintenance of your protective garments.

## Organization of Guide

This guide includes warnings and information related to selection, limitations of use, care and maintenance of your protective garments. It is divided into several chapters addressing specific areas of information and instructions for improving your understanding for the proper selection, use, care, and maintenance of your protective garments. These sections include:

- Selection Considerations
- Use and Limitations of Protective Clothing
- Inspection
- Cleaning and Decontamination
- Repair
- Storage
- Retirement and Disposal
- Special Incident Procedures

The information in this guide is consistent with the following standards:

- NFPA 1950, *Standard on Personal Protective Equipment for Technical Rescue Incidents, Emergency Medical Operations, and Wildland and Urban Interface Firefighting*, 2025 edition (includes requirements for NFPA 1951 for technical rescue incident PPE, NFPA 1977 for wildland firefighting PPE, and NFPA 1999 for emergency medical operations PPE).
- NFPA 1857, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents and Wildland Firefighting*, 2026 edition (includes selection, care, and maintenance requirements related to NFPA 1855 for technical rescue incident PPE and wildland firefighting PPE).
- NFPA 1891, *Standard on Selection, Care, and Maintenance of Hazardous Materials, CBRN, and Emergency Medical Operations Clothing and Equipment*, 2022 edition (includes selection, care, and maintenance requirements related to reusable emergency medical protective garments and ensembles).

A short list of key changes for these standards compared to the prior editions, where applicable, are provided below.

It is important for you to refer to NFPA 1857, 2026 edition or NFPA 1891, 2022 edition, and to other standards that may apply to your fire department or organization. A list of references and how to obtain copies of these references appears later in this guide.

The glossary contains specific terms important in using and understanding this guide.

## Key Changes in NFPA 1950 and NFPA 1857

Significant changes have been made in both the product standard defining minimum requirements for technical rescue incident protective garments, emergency medical operations garments, and wildland/urban interface firefighting garments (NFPA 1950) and the end user standard (NFPA 1857) that specifies the minimum requirements for selection, care, and maintenance of these products by fire departments and other organizations.

### New or Modified Requirements within NFPA 1950 (for protective garments)

NFPA 1950, 2025 edition consolidated three separate product standards into one document, including:

- NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents* (2020 edition).
- NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations* (2018 edition).
- NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*

and Urban Fire Fighting (2022 edition).

The consolidation involved establishing a uniform set of references, definitions, and certification requirements with separate chapters for each type of PPE addressing unique certification, labeling and information, design, performance, and test method requirements.

Changes are shown by type of garment based on the prior edition of the product standard and NFPA 1950.

### **NFPA 1950-2025 versus NFPA 1951-2020 (technical rescue incidents)**

- Garments are no longer permitted to have a pass-through opening in the barrier layer.
- Provisions were added nonvisual/machine readable tags.
- New requirements were added to reduce the risk of ignition from electrical circuitry incorporated in garments.
- Where high visibility materials are used on garments, placement of high visibility trim material must meet ANSI/ISEA Type P Class 2 or 3 requirements or meet a separate requirement for overall garment luminance.
- A new flash fire test was added to evaluate the material in a manikin-based test.
- The name of “blood-borne pathogen protective garments” was changed to “liquid barrier protective garments.”
- For liquid barrier protective garments:
  - The minimum level of breathability (total heat loss) was reduced from 450 W/m<sup>2</sup> to 400 W/m<sup>2</sup>.
  - An evaporative resistance test was added to supplement breathability requirements.
  - The requirement for the viral penetration resistance test was relaxed.
  - An alternative flame resistance test was established for evaluating barrier layers.
  - The barrier layer was exempted from thermal resistance criteria.
- Modifications were made for other parts of the standard clarify various requirements or updated method.

### **NFPA 1950-2025 versus NFPA 1999-2018 (emergency medical operations)**

- Provisions were added nonvisual/machine readable tags.
- New requirements were added to reduce the risk of ignition from electrical circuitry incorporated in garments.
- The garment material water resistance requirement was made more stringent.
- An evaporative resistance test was added to supplement breathability requirements.
- The requirement for the viral penetration resistance test was relaxed.

- A separate annex was put together to provide generalized guidance for selection, care, and maintenance of emergency medical operations PPE.

### NFPA 1950-2025 versus NFPA 1977-2022 (wildland/urban interface firefighting)

- Provisions were added nonvisual/machine readable tags.
- New requirements were added to reduce the risk of ignition from electrical circuitry incorporated in garments.
- The garment sizing requirements were significantly revised to expand the number of available sizes, address different body shapes, and provide clarity for measuring garment dimensions. The ability to provide customized sizing for garments was removed.
- A uniform garment material breaking strength requirement was established.
- The minimum level of particulate filtration efficiency was reduced from 90% to 70% for garments with optional particulate protection.

### Multifunctional Protective Garments

Two new categories of product certification were added to NFPA 1950 to address garments that can be represented for different emergency operations without having to be individually certified to each respective standard; these include:

- **Non-Liquid Barrier Multifunctional Garments:** The requirements for this category are primarily based on the technical rescue incident garment (non-liquid barrier) design and performance criteria and are supplemented with some criteria from wildland firefighting garments.
- **Liquid Barrier Multifunctional Garments:** The requirements for this category are primarily based on the technical rescue incident garment (liquid barrier) design and performance criteria and are supplemented with some criteria from emergency medical operations garments.

The intent of these new multifunctional garments is to provide protection to emergency response personnel against a range of different hazards that are addressed in NFPA 1950 to be used in lieu of protective ensembles for structural or proximity firefighting, or hazardous materials operations. Intended operations include various types of technical rescue, such as victim vehicle extrication, the provision of emergency medical care, or wildland firefighting where lightweight, lower physiological impact PPE is needed for extended operations.

### Electrical Circuitry

New for all garments are separate requirements to demonstrate the non-incendive and intrinsic safety of any electrical circuitry that is included as part of the garment. These requirements include classification of this equipment to specific non-NFPA standards.



## New or Modified Requirements for within NFPA 1857 and NFPA 1891 (for protective garments)

Like NFPA 1950, NFPA 1857 represented the consolidation of separate standards:

- NFPA 1855, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents* (2018 edition)
- NFPA 1877, *Standard on Selection, Care, and Maintenance of Wildland Firefighting Protective Clothing and Equipment* (2022 edition)

The new NFPA 1857 does not address protective garments for emergency medical operations. Instead, those clothing items are addressed both in Annex C of NFPA 1950 and NFPA 1891.

### **NFPA 1857-2026 versus NFPA 1855-2018 (technical rescue incidents)**

- The risk assessment section was updated to include the optional liquid barrier technical rescue garment.
- The maximum acceptable pH permitted for detergents and cleaning agents was reduced from 10.5 to 9.5.
- Modifications were made to the cleaning procedures to account for non-water-based machine cleaning.

### **NFPA 1857-2026 versus NFPA 1877-2022 (wildland firefighting)**

- Options were expanded for who can perform cleaning, inspection, and repair services
- Guidance on protecting the public and personnel from contaminated gear was clarified, including the use of public laundries.
- The maximum acceptable pH permitted for detergents and cleaning agents was reduced from 10.5 to 9.5.
- The allowable maximum washing and drying temperatures increased from 105oF to 120oF.
- An allowance was made to use liquified carbon dioxide-based machines for cleaning.
- As there were no preexisting selection, care, and maintenance requirements specified until the current NFPA 1891 or NFPA 1950, no changes are reported.

# Types of Warnings

Each section of this guide is important; however, within each section of this guide, different types of warnings are given to attract your attention to specific limitations or potential hazards. Specific “signal words” indicate the level of the severity (consequences) of the particular warnings as shown at right.

Be sure to read the other text in this Guide accompanying any warning as it provides additional important information to assist you in understanding the warning.

## General Precautions

Firefighting and emergency operations are ultra-hazardous, unavoidably dangerous activities. To reduce your risk of death, burns, injuries, diseases, and illnesses, you must carefully read and strictly follow this entire FEMSA Official User Information Guide and all labels on your protective garments and other parts of your protective ensemble.

When you fight fires or engage in emergency operations, you are constantly at risk of death, burns, injuries, diseases, and illnesses. There is no such thing as a “routine” or “ordinary” fire or emergency operation. While use of safety equipment such as a protective ensemble, including your protective garments, can reduce your risk of death, burns, injuries, diseases, or illnesses, it does not make firefighting and emergency operations completely safe. Even with the use of your protective ensemble, firefighting is unavoidably dangerous.

This entire guide deals with issues that directly affect your life and safety. Even such matters as how you clean, store and maintain your protective garments and how well the garments fit, directly impact your life, safety and well-being. It is important to read and heed this entire guide to reduce your risk of death, burns, injuries, diseases, and illnesses.

- As described in this guide, before and after every use, carefully inspect your protective garments for cleanliness (soiling and contamination), physical damage, thermal or physical damage, missing components, broken or missing stitching, proper assembly of the shell, any liner, and poor fit. You may need to further inspect and evaluate certain garments for specific conditions as described in the Inspection Chapter below. Do not use your protective garments if you detect any condition indicating damage, degradation or weakening of the garments’ protective capabilities.
- Keep your protective garments clean and properly maintained as described in this Guide. Soiled, contaminated or damaged garments present several different hazards that increase your risk for death, burns, injury, diseases, and illnesses.
- It is impossible for you to test most performance properties of your protective garments in the field. Knowledgeable, experienced and qualified people within your organization or by qualified facilities should periodically inspect and service all elements of your protective ensemble, including your protective garments.

- Your protective garments will age. NFPA 1857, dictates a mandatory retirement for technical rescue garment gear of fifteen years from the date of manufacture and ten years for a technical rescue garment with optional liquid barrier protection. However, this should not be construed as meaning that all protective garments will last for fifteen years (or ten years). NFPA 1857 does not prescribe a specific retirement requirement for wildland garments. Similarly, NFPA 1950 Annex C or NFPA 1891 does not set a maximum life for reusable emergency medical protective garments. The usable service life of your garments is dependent on the number, type and degree of exposures, the work environment, frequency of use, and the quality of care and maintenance for the garments. It is the responsibility of both you and your fire department or employer to determine when to take your garments out of service and how to do so. Do not use any garments showing signs of damage, weakening or degradation of any protective quality. Most garments will generally wear out or lose protective properties before their NFPA 1850 (1851) established maximum service life.
- For any operations involving firefighting or potential exposure to high heat, do not wear garments or other items under your protective garments that may melt or transfer heat onto your skin (such as, but not limited to, synthetic material shirts, underwear, or metal jewelry).
- Never use your protective garments in firefighting or emergency operations unless you are at the peak of mental alertness and physical fitness. Do not engage in firefighting or emergency operations while under the influence of drugs, alcohol or other conditions or factors that would impair your physical and mental abilities.
- You must use extreme caution at all times for all emergency operations. You must be constantly and fully aware of your surroundings, stay alert, react to changing conditions, know (through training) your limitations and the limitations of your equipment (through training and applying NFPA and OSHA standards). You must avoid exceeding these limitations at all times.

The discussion on hazards in this guide are simply examples of the many circumstances and variable factors that can combine in countless different ways to harm you. It is impossible to list all of the ways in which you may be killed, burned, injured, or suffer disease and illness. No protective ensemble can provide complete protection from all conditions. As a firefighter or emergency responder you work in an ultra-hazardous environment. Even using your protective ensemble, exercising extreme caution, and with the best training and supervision, your firefighting and emergency activities remain ultra-hazardous and unavoidably dangerous.

## How to Reduce Your Risk

You can reduce, but not eliminate, your risk of death, burns, injuries, diseases, and illnesses through the following:

- Receiving proper training and continual practice in firefighting and emergency tactics and safety.
- Selecting, maintaining and using your safety equipment properly.

- Exercising extreme caution at all times. Your protective ensemble does not make you completely safe from death, burns, injuries, diseases, or illnesses.
- Understanding the design, performance, and use limitations of applicable versions of NFPA 1550, NFPA 1581, NFPA 1950 (1951, 1977, and 1999), NFPA 1857 (1855 and 1877), NFPA 1891, NFPA 2500, and other NFPA standards, as well as applicable Federal, state and local regulations specific to the selection, use, care, and maintenance of firefighting personal protective equipment (e.g., regulations of the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor contained in 1910.120, "Hazardous Waste Operations and Emergency Response," 29 CFR Parts 1910.132-140, "Personal Protective Equipment" and 29 CFR Part 1910.1030, "Bloodborne Pathogens."). You must understand the content of these publications.

## Training by Your Fire Department or Employer

This guide does not discuss emergency operations, firefighting tactics, and safety procedures. Your fire department or employer must provide proper training and constant practice in emergency operations, firefighting tactics, and safety procedures consistent with its knowledge and basic approach to all emergency operations that it expects to encounter.

Your fire department or employer is in the best position to know and respond to the dangers present in any fire or emergency operation. Accordingly, your fire department or employer must select the appropriate type of safety gear (including protective ensemble for technical rescue incidents, emergency medical operations, and wildland or urban interface firefighting) for use at every fire scene or emergency operation.

This guide instructs you on how to maintain your protective garments. It also tells you about the limitations of your protective garments and your overall protective ensemble. No protective garment or protective ensemble or any other safety equipment protects you from all burns, injuries, diseases, illnesses, conditions, hazards, or death.

To reduce—but not eliminate—your risk of death, burns, injuries, diseases, or illnesses, you must carefully read, fully understand, and strictly follow this entire guide and all labels on your protective garments, the applicable NFPA standards, and OSHA and other applicable regulations. The information contained in this guide and on the labels in your protective ensemble are for your safety and can save your life.

Remember, however, that even with the best protective ensemble, safety procedures and training, you are constantly at risk of death, burns, injuries, diseases, and illnesses during firefighting and emergency operations.

# HAVE YOU READ AND UNDERSTOOD THIS FEMSA OFFICIAL USER INFORMATION GUIDE?

The FEMSA Official User Information Guide contains vital safety warnings and important user instructions. Do not use your protective garments until you have read and understand all information contained in it. Below is a simple worksheet that you should complete before using your protective garments.

1.	Have you completed all required training to properly and safely perform your duties as a firefighter and/or emergency responder?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.	Have you read and do you understand all warnings, precautions, directions, and instructions contained in this FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.	Have you read and do you understand the intended use and limitations of your protective garments contained in the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
4.	Have you read and do you understand the inspection, cleaning, repair, and maintenance warnings and instructions contained in the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5.	Have you read and do you understand the requirements for storage, retirement and disposal of protective clothing contained in the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
6.	Before using your new protective garments, have you inspected them and established that they fit you properly as outlined in the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
7.	Are you familiar with how to obtain replacement guides and how to contact your manufacturer for any additional information you may require as outlined in the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No
8.	Do you understand that during wildland firefighting, the human skin will burn at temperatures much, much lower than the fabrics used in your protective garments and that you may sustain a burn or other injury with little or no warning?	<input type="checkbox"/> Yes <input type="checkbox"/> No
9.	Do you understand that no protective garments can protect you from all hazards and/or conditions that you might encounter while performing your job?	<input type="checkbox"/> Yes <input type="checkbox"/> No
10.	Have you read, do you understand, and do you agree to accept the risks and responsibilities outlined in the personal responsibility code located on the back cover of the FEMSA Official User Information Guide?	<input type="checkbox"/> Yes <input type="checkbox"/> No

**DO NOT WEAR** YOUR PROTECTIVE GARMENTS UNTIL YOU HAVE ANSWERED **YES** TO EACH OF THESE QUESTIONS.

# Chapter 2

## Selection Considerations

### Mission Specific Requirements

Selecting your technical rescue incident, emergency medical operations, and wildland and urban interface firefighting protective garments first involves that you understand your protective garment is part of an overall ensemble of different protective clothing and equipment that combined to provide overall protection against anticipated hazards depending on the specific emergency or firefighting operations you face. Depending on the specific response activity, these ensembles will utilize different clothing and equipment items.

### Technical Rescue Incidents

Protective ensembles include, but are not limited to garments, helmets, goggles, gloves, and footwear. In some cases, a respirator may also be provided as part of the ensemble for specific incidents where inhalation hazards may be encountered. These ensembles may also include the wearing of special harnesses for fall protection and confined space entry. These ensembles are intended for protecting emergency response personnel during complex rescue incidents, which require specially trained personnel and special equipment to complete the mission. Typical missions can entail search, rescue, treatment, decontamination, recovery, site stabilization, and similar operations. Examples include:

- Vehicle and Machinery Extrication: Using specialized tools to remove victims trapped in cars or industrial equipment.
- Rope Rescue: Rescuing individuals from high-angle environments like cliffs, towers, or cranes.
- Confined Space Rescue: Extracting people from tanks, pipes, silos, or tunnels with limited access.
- Trench Rescue: Stabilizing and rescuing workers from collapsed trenches or excavations.
- Structural Collapse Rescue: Locating and extracting victims trapped in debris from building failures, explosions, or natural disasters.
- Vehicle and Machinery Extrication: Using specialized tools to remove victims trapped in cars or industrial equipment.
- Wilderness/Cave Rescue: Locating and rescuing missing or trapped individuals in remote or subterranean environments.



**DANGER**

**Do not use a technical rescue or multifunctional garments addressed by this user information guide for any water operations, particularly swift water rescues. These garments are not suited for this application.**

**Using these garments for such operations increases your risk of drowning, injuries, diseases, and illnesses.**

This user information guide does not address protective garments for any type of water rescue operations, including emergencies in fast-moving water, floods, ice, or surf. Refer to NFPA 1955, *Standard on Personal Protective Equipment (PPE) for Surface Water Operations and Contaminated Water Operations* (2025 Edition) for the correct protective garments, other clothing items, and equipment.

The hazards encountered during these incidents are mainly physical and environmental in nature, but also can involve thermal exposures (e.g., a flash fire from a broken gas line), contact with contaminants such as chemicals, sewage, and potentially infectious body fluids, and being struck by vehicles or heavy moving machinery. NFPA 1950 differentiates between regular technical rescue garments and those with optional liquid barrier protection. It also distinguishes between garments that incorporate high visibility materials, that may otherwise be achieved through separate supplemental garments.

## Emergency Medical Operations

Emergency medical operations generally entail a tiered approach for how an ensemble may be configured based on the type of response and the expectations of exposure. These operations include the provision of emergency patient care and transportation prior to arrival at a medical facility by emergency medical responders, emergency patient care by medical first receivers at a medical care facility, and body recovery by emergency medical responders. Expected hazards principally are any exposure to body fluids or other liquids that may potentially include infectious microorganisms. Emergency medical operations can also entail airborne infections hazards such as diseases spread by droplets and aerosols that are inhaled or deposited on responder mucous membranes. These responses also present physical and environmental hazards.

Ensembles for emergency medical operations typically include a garment, a helmet, gloves, footwear, and some type of eye and face protection that can be either goggles, a face shield, face mask, or respirator. There are several variants of these protective items. For example, garments may be disposable or reusable. Garments may also be full body, covering the wearer's torso, arms, and legs, or only partially covering portions of the body to be protected such as gowns or smocks, aprons, and sleeves. Organizations may choose to have their responders wear those items where it believes exposure is most likely depending on the potential volumes of contaminated fluids and responder contact that can occur during emergency medical operations. For example, some organizations will always deploy protective (examination) gloves, sometimes also with a faceshield, and only use garments where high volumes of blood may be present such as at a victim extrication or body removal operation. Other organizations may include consistent use of protective garments for nearly all emergency medical operations.

This user guide addresses only reusable protective garments that are primarily full body garments.

## Wildland and Urban Interface Firefighting

The activities of fire suppression and property conservation in woodlands, forests, grasslands, brushlands, prairies, and other similar vegetation, or any combination of vegetation, that is involved in a fire situation but not within buildings or structures is considered wildland firefighting. Urban interface firefighting is defined as activities of fire suppression and property conservation with areas of housing or other structures that are either intermingled with or are next to vegetation of forest lands. For this type of firefighting, the expected exposure hazards are high heat, particularly from radiant sources, and limited flame contact. There are also physical hazards for work in rough terrain and environmental hazards due to operations under a range of climate and weather conditions for extended operations. In urban interface fires, hazards escalate because the risks of remote forest fires or open land fires merge with the complex toxic and structural dangers of populated areas. Contaminants can become more complex because of the transition from vegetative materials to synthetic materials; “artificial” hazards can be encountered such as exploding propane tanks and downed power lines. However, many similar thermal, physical, and environmental hazards can be found in both types of firefighting.

Wildland and urban interface firefighting protective ensembles are comprised of protective garments, a helmet, work gloves, footwear, and goggles. Also included in these ensembles can be face/neck shrouds, load carrying equipment to facilitate carrying gear, and chainsaw protectors in the form of leggings or chaps. Cold weather gear may also be provided for cooler operations. Driving gloves replace work gloves for firefighters or other emergency responders driving vehicles or operating heavy equipment.

Because wildland firefighters are exposed to smoke and particulates in the course of their operations, protective garments can also be optionally evaluated for particulate protection where the textile materials used are evaluated for their effectiveness in preventing the penetration of small particles representative for fireground soot.

Garments may be described as either wildland firefighting garments or wildland and urban interface firefighting garments based on how the garment is labelled. However, distinctions between the two firefighting activities are not made in the design or performance of the respective garments.

## General Selection Approach and Information

Ensemble and garment selection entails three parts:

1. Your fire department or employer selects the appropriate protective ensemble including protective garments to purchase.
2. You, your fire department, or your employer, decide which ensemble to wear for a specific firefighting or other emergency operation.
3. You ensure that your protective ensemble elements, including your protective garments, are correctly fitted for you and that they work together properly with other clothing and equipment you are required to wear for a specific firefighting or other emergency operation.

While your fire department or employer controls some parts of the selection process, you must be aware of the specific hazards that you face during technical rescue incidents, emergency medical operations, wildland or urban interface firefighting and other emergency operations and ensure that the ensemble and ensemble elements that you are wearing fit correctly and work together to provide the intended protection.

## Department or Organization Risk Assessment

Prior to starting the selection process for technical rescue, emergency medical, and wildland and urban interface protective garments, your fire department or employer must perform a risk assessment.

OSHA regulations (Title 29, Code of Federal Regulations Part 1910.132, "General Requirements" of Subpart I, Personal Protective Equipment) require that fire departments and organizations conduct a hazard assessment in their selection of firefighting and emergency operations protective ensembles and ensemble elements. This hazard assessment identifies the specific hazards that firefighters and emergency responders may encounter and involves a determination of the appropriate personal protective equipment (PPE) to protect individuals against those hazards.

Depending on the type of mission, the risk assessment must include, but not be limited to, the hazards that firefighters and emergency responders can encounter, based on the following factors (by mission type):

### Technical Rescue Incidents

- Type of duties performed
- Frequency of use of protective garments
- Organization's experiences
- Incident operations
- Geographic location and climate

Because there are two tiers of garment protection, the NFPA 1857 standard distinguishes differences between a general technical rescue protective ensemble and an ensemble that used protective garments with the optional liquid barrier protection. These distinctions account for expected differences in protection against specific hazards between the two types of garments where protective garments with liquid barrier protection are expected to have the following performance differences compared to regular technical rescue garments:

- High heat and humidity (heat stress): Lower
- Wetness from tool work: Better
- Rain: Better
- High wind: Better
- Bloodborne pathogens: Better
- Chemical skin absorption: Better
- Chemical flash fire: Better

- Chemical explosions: Better
- High convective heat: Same
- Low radiant heat: Same
- High pressure steam: Better
- Hot liquids: Better

These distinctions show that garments with liquid barriers for technical rescue incidents are expected to offer better protection against certain hazards versus garments without liquid barriers; however, liquid barrier garments will create increased heat stress hazards.

## Emergency Medical Operations

The selection of emergency medical protective ensembles and garments is addressed in NFPA 1891 and Annex C of NFPA 1950. Since NFPA 1891 primarily addresses hazardous materials operations, many of the selection factors related to the risk assessment are specific to chemical exposures. Factors that are specific to emergency medical operations PPE include:

- The likelihood of members to be exposed to biological hazards that occur as the result of exposure to bloodborne pathogens or other infectious diseases that could occur as the result of emergency medical operations.
- Ruggedness or physical hazards with the response environment.
- Operations on elevated platforms, near roadways, or around open water.
- Activities of rescue of affected victims or other protection of civilian personnel.
- Compatibility of emergency medical operations PPE with operational equipment.

## Wildland and Urban Interface Firefighting

- Type of duties performed
- Frequency of use of protective garments
- Organization's experiences
- Incident operations
- Geographic location and climate

## Types of Protective Garments

Garments certified to NFPA 1950, 2025 Edition are required to meet several specific design criteria and performance criteria that affect how protective garments for technical rescue incidents, emergency medical operations, and wildland / urban interface firefighting are configured and selected. Some of important requirements my mission type include are given in the sections below.

### Garments for Technical Rescue Incidents

Garment designs following features or requirements:

- May be two-piece as a coat and pants or a one-piece overall.
- May be single-layer or multi-layer garments. Multi-layer garments are more likely to have optional liquid barrier protection.
- Coats and coveralls must have a collar, cannot have turn-up cuffs, have a closure system on sleeves cuffs for a snug fit around the wearer's wrist, use positive locking closures on the coat front and pants fly, and provide drainage for expandable pockets.
- Hardware must be free of burrs and rough finishes and not come in contact with the wearer's body.
- Garments must be provided in both men's and women's sizes in a range of chest circumferences and sleeve lengths for coats and waist circumferences and inseams for pants.
- Garments meeting the optional liquid barrier protection requirements that have liners have to meet certain criteria related to the area of coverage and manner of attachment as well as being designed for continuous liquid protection.
- Garments meeting optional high visibility requirements must also meet a separate standard on the placement and performance of high visibility materials.
- Many garment may have emblems or patches for identifying the organization or function of the responder.

Garments are also subject to several performance requirements:

- Garment composites (all material layers) are subject to total heat loss testing for demonstrating minimum breathability.
- Garment materials are tested for flame resistance, heat and thermal shrinkage resistance, cleaning shrinkage, breaking strength, tear resistance, and seam strength; these materials are also put through an evaluation on instrumented manikin in simulate flash fire to show percentage of body burn.
- Outer garment materials are also evaluated for abrasion resistance and water absorption resistance.
- Thread must resist melting.
- Hardware is tested for corrosion resistance while different closure types are evaluated for strength.
- Labels are tested for continued attachment and legibility following several exposure conditions.

- Where liquid barrier materials are used, they are also evaluated for liquid penetration resistance and viral penetration resistance while the composite with the liquid barrier material is tested for evaporative resistance as an additional measure of breathability.

## Garments for Emergency Medical Operations

- Emergency medical protective garments have the following design criteria:
- May be fully body clothing such as jackets or pants, or coveralls, or non-full body clothing such as aprons, sleeve protectors, sleeved aprons or smocks, and hoods. Specific coverage requirements are specified for partial body clothing items.
- Barrier layers in garments must be a single non-separable layer.
- Where visibility materials are used on garments, they must meet requirements in a separate standard on high visibility safety apparel.

These garments also must meet the following performance criteria:

- The overall garment must pass a liquid integrity test and a functionality test.
- Garment materials must meet minimum requirements for tensile strength, burst strength, puncture (snag) resistance, tear resistance, water absorption resistance, and seam strength.
- Barrier layers and seams must pass a viral penetration resistance test.
- All layers in combination must meet minimum breathability requirements in total heat loss and evaporative resistance testing.
- Hardware must show no corrosion in a test while different closure types are evaluated for strength.
- Labels are tested for continued attachment and legibility following several washings.

## Garments for Wildland and Urban Interface Firefighting

Wildland or urban interface protective garment design requirements include:

- May be two-piece as a coat and pants or a one-piece coverall.
- Coats and coveralls must have a 3-inch-high collar and a closure system.
- Coveralls must have a front closure system that extends from the crotch to the top of the neck.
- Garment sleeves must have a closure system on sleeves cuffs for a snug fit around the wearer's wrist.
- Exterior pockets and garment passthroughs must have a cover flap.
- Hardware must be free of burrs and rough finishes and not come in contact with the wearer's body.
- Garments with high visibility materials must provide 360-degree visibility.
- Garments must be sized as meeting a specific set of key dimensions for each size.

Garments are also subject to several performance requirements:

- All garment material layers are subject to total heat loss testing for demonstrating minimum breathability.
- Garment materials are tested for radiant heat resistance, flame resistance, heat and thermal shrinkage resistance, cleaning shrinkage, breaking strength, tear resistance, and seam strength. Knit material linings are tested for burst strength
- Hardware is tested for corrosion resistance while different closure types are evaluated for strength.
- Thread is evaluated for melting resistance and strength.
- Labels are tested for continued attachment and legibility following several exposure conditions.
- Garment materials may be optionally evaluated for particulate protection using a filtration test.

## Multifunctional Protective Garments

NFPA 1950 also addresses garments for a broad set of missions that can include combinations of technical rescue, emergency medical operations, and wildland or urban interface firefighting. Specific design and performance criteria mimic the criteria from the different missions:

- Nonliquid barrier multifunctional garments must meet the design criteria for technical rescue incidents (without a liquid barrier) and similarly the performance criteria but with the additional of radiant heat resistance, hardware heat resistance, and zipper crosswise breaking strength.
- Liquid barrier multifunctional garment must meet both the design and performance criteria for technical rescue incident garments with the optional liquid barrier performance with the addition that barrier layers are evaluated for heat resistance and zippers are evaluated for crosswise breaking strength.

# Selection for Purchase

Each fire department or organization uses a different process for the selection of PPE for technical rescue incidents, emergency medical operations, and wildland and urban interface firefighting. As a minimum, this process must ensure that the protective garments comply with the applicable portions of NFPA 1950.

General requirements are provided in NFPA 1857 for fire departments or organizations to consider when they choose specified protective garments and other protective clothing. These include the conduct of a risk assessment to determine relevant hazards and a process of preparing a specification that reflects the findings of the risk assessment and organizational preferences. Fire departments and organizations may also conduct field trials and other evaluations in assessing protective garments being considered.

# Selection for Use

You should use your protective garment based on its intended use as instructed by your department or organization consistent with your department's or organization's standard operating procedures or practices. It is essential that you wear the correct garment for the correct mission. This user guide only covers the following missions:

- Technical rescue incidents
- Emergency medical operations
- Wildland and urban interface firefighting

NFPA standards exist for different types of ensembles used at other emergency incident operations, including but not limited to structural and proximity firefighting (NFPA 1970) and hazardous materials and CBRN operations (NFPA 1990). These standards have significantly different requirements as compared to those in NFPA 1950, which is the subject of this user information guide. Your department is responsible for determining the suitability of specific ensembles for specific emergency operations.

The garments covered in this user information guide are NOT suitable for structural or proximity firefighting and should not be used in any interior firefighting operations.

- **Structural firefighting** is the physical activity of rescue, fire suppression and property conservation in buildings, enclosed structures, vehicles, marine vessels, or like properties that are involved in a fire or an emergency. Structural firefighting involves a large range of different fire ground hazards and constantly changing conditions.
- **Proximity firefighting** involves specialized firefighting operations that can include rescue activities, fire suppression and property conservation at incidents involving fires producing high levels of radiant heat as well as conductive and convective heat.

The garments covered in this user information guide are also NOT suitable for incidents involving hazardous materials or CBRN agents.



## DANGER

**Your protective garments are part of a protective ensemble, which is not suitable for all types of firefighting and all types of emergency operations. DO NOT use this garment for protection during structural firefighting, proximity firefighting, or hazardous materials operations. Use of an unsuitable protective ensemble and garments may lead to death, burns, injuries, diseases, and illnesses. In order to reduce your risk, your fire department or employer must make a determination as to whether your protective ensemble is suitable for each specific application.**

# Protection Limitations for Different Emergency Hazards



## DANGER

**Protective garments and their corresponding ensembles addressed in this guide do not protect against all hazards and under all circumstances of use. Use of a protective garment unsuitable for a specific use may lead to death, burns, injuries, diseases, and illnesses. It is the responsibility of the end user to assess potential hazards and the risk for exposure to determine the suitability of the protection ensemble for a specific use.**

## General Hazard Categories

It is essential that you understand the different types of ensembles and the limitations of protective ensembles to protect against potential hazards. The general categories of potential hazards that you may encounter during wildland or urban interface firefighting, technical rescue incidents, and emergency operations missions include, but are not limited to:

- Thermal hazards
- Chemical, biological and radiological hazards
- Physical hazards
- Electrical hazards
- Hazards caused by the wearing or use of the equipment itself
- Hazards based on your position and operating area

The frequency and severity of exposure to these hazards vary with the specific locations, operations, conditions, and time. Consequences of exposure to different hazards may range from no effect to death. The risk associated with a hazard is dependent on the likelihood of exposure in combination with the consequences of the exposure. In the sections below, some hazards are generalized to the entire ensemble since many exposures can affect multiple areas of the emergency responder or firefighter.

Many of the specific hazards covered in this part of the guide are explained in terms of the overall ensemble that also includes the protective helmet, protective gloves, protective footwear, and protective hoods, in addition to protective garments.

The type of mission will often but not always will dictate the likelihood of hazards you may encounter as well as their severity. Certain general expectations for protection exist for each type of mission, but there are significant limits to the protection provided against specific hazards. For the specific garment types covered in this user information guide, the following general expectations exist.

## Technical Rescue Incidents

Technical rescue protective garments are intended to provide limited protection for:

- Thermal hazards during duration events, such as an accidental flash fire (not to be confused with a flashover in regular firefighting) or incidental contact with a small flame.
- Physical hazards encountered in rough or difficult operating environments.
- Chemical and biological hazards but only for garments with limited liquid barrier protection.
- Being struck by vehicular traffic or heavy machinery hazards but only for garments that meet additional high visibility requirements.

Technical rescue protective garments are also intended to create less physiological stress as compared to bulkier clothing such as structural firefighting protective clothing. These garments may offer very limited protection against different hazards, depending on the exposure conditions and duration.

## Emergency Medical Operations

Emergency medical protective garments are intended to provide limited protection for:

- Biological hazards, primarily in the form of bloodborne and other potentially infectious liquids.
- Physical hazards encountered in rough or difficult operating environments.
- Being struck by vehicular traffic or heavy machinery hazards but only for garments that meet additional high visibility requirements.

**These garments do not offer any thermal protection in terms of flame or heat contact.**

Emergency medical operations protective garments are also intended to create less physiological stress as compared to bulkier clothing such as structural firefighting protective clothing.

These garments may offer very limited protection against different hazards, depending on the exposure conditions and duration.

## Wildland and Urban Interface Firefighting

Wildland and urban interface garments are intended to provide limited for:

- Thermal protection against low levels of radiant heat exposure or incidental contact with a small flame.
- Physical hazards encountered in rough or difficult operating environments.
- Being struck by vehicular traffic or heavy machinery hazards but only for garments that meet additional high visibility requirements.
- If the garment a layer or has been tested for particulate blocking capabilities, it may have only a very limited capacity for keeping soot and other particles from reaching your skin.

**These garments do not offer protection from any chemical, biological or radiological hazards.** They may or may not offer protection against electrical hazards.

Wildland and urban interface firefighting protective garments are also intended to create less physiological stress as compared to bulkier clothing such as structural firefighting protective clothing. These garments may offer very limited protection against different hazards, depending on the exposure conditions and duration.

## Thermal Hazards

Thermal hazards represent extremes of temperatures and heat energy. These hazards arise from either high heat that can be from radiant, convective, and conductive transfer to your clothing and underlying skin resulting in burn injuries, or exposure to similar forms of very low temperatures that cause your body to lose heat and affect your skin and core temperature, which in turn can cause frostbite and hypothermia.



**DANGER**

**If your protective garment is exposed to any type of heat, including but not limited to radiant, convective or conductive heat, you may be burned underneath the protective garment with no warning and no sign of damage to the protective garment. Be constantly alert to the possibility of a type of thermal exposure and other hazards.**

### High Heat Exposures

In the case of firefighting, the principal hazard is exposure to high temperatures and heat energy that can cause burn injury. In firefighting, burns are a constant threat regardless of conditions. The three types of heat transfer include:

- **Conductive heat** – caused by direct contact with the heat source. Examples of conductive heat transfer would be standing or kneeling on hot embers or leaning against a hot wall of a structure. They can also occur from contact with molten substances and hot liquids.
- **Convective heat** – caused by contact with heated air currents. Hot air flow driven by a flash fire or coming in contact with a flame, even temporarily, are forms of conductive heat transfer.
- **Radiant heat** – caused by heat energy emanating from a distance of a very hot object. The most common example of radiant heat transfer is standing close to an intense fire.

Your protective ensemble does not protect you from all burns and injuries that arise even during short duration exposures. There are limits to the protection your protective ensemble can provide. Examples of these limitations are given below:

- For technical rescue incidents, a flash fire may occur when combustible gases, liquids, or solid particles are at concentration in the flammable range that encounters an ignition source that results in a relatively short, but intense fireball with extreme amounts of radiant and convective heat. A common example is a burst gas line that leaks into a confined space that is then ignited by a spark, static electricity, or small flame. Generally, the amount of ignited fuel, overall fuel concentration, the environmental conditions, and the characteristics of the operating area will affect intensity of the exposure. If the energy released by such an event reaches your clothing, the amount of heat energy transferred through the protective garment can exceed the ability of your skin to dissipate that heat quickly enough, and result in any burn injury.
- In wildland and urban interface firefighting, you may be exposed to radiant heat even if operating at a distance from any direct flames from either burning vegetation or structures, in the case of urban interface firefighting. Since burns are a function of exposure energy and time, the closer you are to a fire, then higher levels of heat will impinge on your protective clothing and transfer to your body.
- Both types of protective garments for technical rescue incidents and wildland/urban interface firefighting are constructed of flame and heat-resistant materials. While these materials may attenuate the effects of both small fires and high heat, they may not offer sufficient insulation from heat transfer

that can result in burn injuries. Even though you may not notice any thermal damage to your protective garment, you can still be burned suddenly and without warning. Heat can also build up and be stored in your garment materials, particularly during radiant and convective heat exposures, to the point where your skin burns. Your skin burns at temperatures far below the temperatures that cause damage to your garment materials.

- In any emergency situations, if your protective garment encounters a heated surface, sufficient heat transfer can occur by conduction resulting in a burn injury. Your weight or how you press against a surface may further increase the rate of heat transfer that results in earlier burn injury.
- You can also be burned by molten substances that may be present near a fire, heated water or other liquids, and by steam. Some molten substances may “stick” to your garment materials increasing the intensity of conductive heat transfer. Without a liquid barrier, a hot liquid or steam may penetrate and wet your garment materials, and still cause burn injuries.
- Clothing compression will also result in faster convective and radiant heat transfer. This compression does not mean you have to be in direct contact with a hot surface. Clothing stretched across your body such as a bent elbow or knee can bring the garment materials closer to your skin, removing the insulative air layer that attenuates some of the heat transfer from the exterior side of your protective garment outer surface.
- Further, if your protective garment is wet either from exterior exposure to water or simply by sweating, wet garment materials also result in faster heat transfer as the moisture fills the small voids in the material allowing for greater heat conduction.
- You are at the greatest risk of burn injuries if any portion of your body is unprotected. This is particularly true of a protective garment in the interface areas with your head/neck, arm/hand, and any garment overlapping areas.

Because there are so many variables that are constantly changing in any emergency, it is impractical to anticipate when or if your skin will reach the temperature where enough energy has passed through to increase the risk of burn injury. If you feel heat when being exposed to a thermal condition, then there is a strong likelihood that you will be burned. It is important to limit any exposure that you have to high heat to reduce the likelihood of a burn injury. This means changing a position or taking some action to limit your exposure. The best measures are to avoid any sustained heat exposure or situations that are likely to put you in a high heat environment for anything but a very short duration.

Emergency medical protective garments are not required to be flame or heat-resistant or offer any exposure to high heat thermal exposures. These garments cannot be worn in emergency operations where there is no expectation of exposure to even low levels of conductive, convective, and radiant heat. If your emergency medical operation protective garments have been evaluated for additional standards related to high heat or flame protection, you must check with your department or organization to understand the limitations of your garment in high heat thermal exposures.



**DANGER**

**Do not wear your emergency medical protective garment for protection against any high heat-based thermal exposure. If your protective garment is exposed to any type of heat, it may melt and drip, ignite, and result in the high heat exposure, resulting in death or burn injuries.**

## Extreme Cold Temperatures

Even though your protective garment may be designed to partially limit your risk to short-term high-temperature thermal exposures, it does not protect you from exposure to cold temperature environments. As with hot environments, the ability of your protective ensemble to insulate you in cold environments depends on many factors, including but not limited to the ambient temperature, wind speed, levels of moisture, your physical activity, and the length of time you spend in the environment in which you are wearing your garment and overall ensemble. As with heat exposures, longer exposures at cold temperatures increase the risk of health effects, such as hypothermia and frostbite.

Some garments may be provided with additional liners or for cold weather operations. These garments will improve your insulation from dangerous cold environmental conditions but will not prevent cold temperature exposure injuries.



**DANGER**

**Your protective ensemble may not protect you from chemical, biological or radiological hazards that can cause death, burns, injuries, diseases, and illnesses. To reduce your risk, obtain proper training in recognizing and handling these hazards and choose a suitable protective ensemble.**

## Chemical, Biological and Radiological Hazards

Chemical, radiological and biological hazards (poisons, toxins, carcinogens, radioactivity, germs, infectious body fluids, airborne or bloodborne pathogens, etc.) that firefighters and emergency personnel encounter are a matter of life and death. You are at risk of death, injuries, diseases, and illnesses when exposed to these hazards. As an emergency responder or firefighter, you must learn about these hazards and how to protect yourself from them.

There are numerous Federal, state and local environmental regulations and health codes on how to deal with chemical, radiological and biological hazards. For example, OSHA regulations in 29 CFR 1910.120 cover hazardous waste operations and emergency response while 29 CFR 1910.1030 cover employer requirements for reducing employee exposure to bloodborne pathogens. These regulations apply to firefighters and other emergency responders.

This guide does not address all the hazards associated with chemical, biological or radiological exposures or how to protect you from them. This guide provides limited information on these hazards and tells only how you should go about cleaning, donning and doffing your protective garments to minimize—but not eliminate—your exposure to these hazards. (See later chapters.)

## Chemical Hazards

Chemicals present health, flammability, reactivity, or other hazards. The health hazards associated with different chemicals include, but are not limited to, carcinogenicity, toxicity, sensitization, irritation, and corrosiveness (burns). The specific types of hazards and their severity associated with chemicals vary with the specific chemical and how the exposure occurs. The effects of some hazardous exposures may be immediate and show up during or shortly after the exposure occurs, or exposure effects may not appear until much later following the exposure or following repeated exposure to chemicals.

Chemicals create health hazards by contacting or entering the body through inhalation, skin absorption, ingestion, or injection. While respirators, such as SCBA and air-purifying respirators, are designed to protect firefighters and emergency responders from inhalation or ingestion of chemicals, unless protective garments have a barrier layer that is designed to limit or prevent contact of chemicals with the skin, little or no protection will be offered. The state of the chemicals and their physical properties (density, ease of evaporation, whether present as gas or vapor, liquid or solid) affect how you are potentially exposed to chemicals.

Even with a liquid barrier, either for technical rescue or emergency medical garments, or if your wildland and urban interface garments have been tested for particulate blocking capabilities, your garments will not protect you from all chemical exposures. It is important to realize that:

- **Your protective garments are not vapor-proof.** Chemical gases and vapors penetrate through many portions of your clothing freely, either through the materials, or more likely, through closures and interface areas of your protective ensemble. Depending on the nature of the chemicals, your skin may be exposed to most vapors or gases while wearing your protective ensemble.
- **Your protective garments are not liquid proof.** Even though the materials in your protective garment and the overall protective garment design are evaluated for resisting penetration by liquids, liquids may still penetrate and contact your skin. The ability of liquids to penetrate and contact you depend on the type of chemical, its physical properties, the quantity of chemicals to which you are exposed, and the conditions at the emergency scene.
- **Your protective garments do not stop exposure to all solid chemicals.** Solid chemicals, particularly soot particles, and other contaminants can still enter through closures and interfaces.

Chemicals may also be flammable. The relative flammability of chemicals depends on many factors, including, but not limited to, the state of the chemical, its ease of evaporation and flammable limits. Chemical gases and vapors may accumulate in areas of the emergency scene and present a flash fire hazard. You must avoid flammable vapor exposures. Your protective garment may also absorb hazardous and/or flammable vapors and/or liquids that may later ignite.

Certain chemicals may also present cryogenic and liquefied gas hazards. In this form, chemicals present extreme hazards from cold temperatures and upon release into the environment may create relatively highly concentrated areas of the chemical which present further health and flammability hazards. You must avoid contact with cryogenic and liquefied gas hazards.

Chemicals may also be reactive. Some chemicals react violently, explode or create other hazards when put into contact with incompatible substances. For example, sodium metal reacts explosively upon contact with water. Other chemicals may exhibit severe reactions when exposed to air, heat and other substances. You must avoid contact with known reactive chemicals.

## Biological Hazards

Bloodborne pathogens are bacteria, viruses, germs, and similar harmful microorganisms and substances carried in blood and body fluids, which can cause death, diseases and illnesses. While some of your protective garment has been tested for liquid penetration resistance and material penetration resistance to viruses, this does not mean that it will protect you under all circumstances and from all bloodborne pathogens. Even when wearing protective garments certified to NFPA 1950 (1999) for emergency medical operations, you are still at risk of death, diseases and illnesses due to contact with such pathogens.

Biological hazards also include, but are not limited to, airborne pathogens, biogenic toxins, biogenic allergens, and bites from insects and animals. The range of effects from exposure to these hazards vary with the type of biological agent. Even when equipped with a liquid barrier material, your protective garment limit some exposure to some biological hazards, but do not protect against all biological hazards under all conditions. Airborne pathogens warrant the wearing of a suitable NIOSH-approved respirator, which is not addressed in this user information guide.

## Radiological Hazards

There are two types of radiation: ionizing and non-ionizing. Ionizing radiation includes alpha particles, beta particles, gamma rays, X-rays, and other forms of highly energetic radiation emitted from radioactive materials. Exposure to ionizing radiation causes changes in the body that can result in serious or fatal health effects. Non-ionizing radiation includes ultraviolet (UV) light, infrared light, microwaves, and radio frequencies. Different health effects exist with exposure to the different types of non-ionizing radiation. The exposure intensity and duration affect how radiological hazards cause effects on the human body. Your protective garment does not provide protection from radiological hazards. Therefore, you must avoid contact with all radiological hazards to reduce your risk of death, injuries, diseases, and illnesses associated with radiological exposure.

Technical rescue garments without liquid barrier layers or properties and wildland/urban interface garments do not provide protection against the majority of liquid chemical and biological hazards. Even the best protective ensemble cannot protect you completely from chemical, radiological and biological hazards. Protective garments can reduce—but not eliminate—your risk of death, diseases and illnesses due to these hazards.

## Physical Hazards

Physical hazards include, but are not limited to, falling heavy objects, flying debris, projectiles, abrasive or rough surfaces, sharp or jagged edges, pointed objects, slippery surfaces, and excessive vibration.

Different portions of your ensemble may provide limited protection from some hazards and reduce your risk of death, burns, injuries, diseases, and illnesses for some physical hazards under some conditions. Various objects on the fireground can penetrate, wear away, cut, or puncture portions of your protective garment, exposing your skin or underlying layer to physical trauma. You may also lose traction while walking, running or crawling, or have your body or parts of your body exposed to excessive vibration. You may sustain injury or be killed from physical hazards that overwhelm the protective qualities of your ensemble. For example, you must avoid building collapses and falls. In the event that portions of a building or debris falls on you, you may be at risk of death, burns, injuries, diseases, and illnesses.



**DANGER**

**Your protective ensemble may not protect you from all physical hazards. Be constantly alert to the possibility of physical hazards. Failure to do so may lead to death, burns or injuries.**

## Electrical Hazards

If your protective garment comes in contact with a source of electricity, you may be killed, burned or injured due to electrical shock. Similarly, some forms of high voltage equipment can arc flash causing exposure to extremely high forms of electrical energy. Even if your protective ensemble is dry, clean and properly maintained, you may be electrocuted or injured from an electrical shock. Water and other fluids conduct electricity. Wet, dirty and/or contaminated protective garments may increase your risk of death, burns and injuries due to electrical shock.

Protective garments that include electrical circuitry are evaluated for their non-incendive performance and intrinsic safety. While the specific garments with these devices should not contribute to an explosive situation or create an ignition source, certain conditions can occur where these outcomes are possible, such as when an electrical circuit is damaged.

## Hazards Caused by the Wearing or Use of PPE

The wearing of your protective garment and other clothing and equipment items creates a variety of hazards affecting your body or your ability to safely perform required activities at a firefighting or emergency operation. These hazards are a byproduct of the tradeoffs between providing protection and allowing you to function with restriction. The wearing of any PPE entails these tradeoffs, and the balance between protection and functionality and comfort is a decision made in the selection of your protective garment by your fire department or organization.

Hazards created by the wearing or use of personal protective equipment include, but are not limited to:

- Heat stress.
- Loss of functionality.
- Wet, soiled, contaminated or damaged PPE.
- Allergic reactions when contacting certain materials.
- Improper fit, wearing, or coverage by protective garment.



**DANGER**

**Your protective ensemble, wet or dry, may not protect you from electrical shock. Avoid coming into contact with energized electrical wires and equipment, and otherwise avoid electrical current. Failure to do so may lead to death, burns or injuries.**

## Heat Stress

Heat stress is one of the leading causes of firefighter and emergency responder death and injury. Heat stress is an increase in human body temperature and metabolism caused by physical exertion and/or a heated environment which can lead to exhaustion, mental confusion, disorientation, dehydration, loss of consciousness, heart attack, stroke, and other fatal illnesses. Exerting yourself while wearing your protective ensemble (garments, helmets, gloves, footwear, hoods, eye and face protective devices, and respirators) may increase your level of heat stress. Performing strenuous tasks in the heated environment of a emergency or fire scene or in warm and/or humid weather may also increase your heat stress.

Even though your protective garment may be breathable, the garment design and materials will affect how your body is able to cool itself from sweat evaporation and conduction. If your protective garment also has a liquid barrier, this additional layer or material capability will further affect the ability of your body to regulate body temperature under hot, humid, and high work conditions.

To reduce your risk of heat stress, you must:

- Know your physical limitations. Consult your physician; be in top physical condition.
- Make sure your protective ensemble, including your protective garment and equipment fit properly to allow adequate freedom of movement.
- Avoid undue exertion and/or prolonged exposure to heated environments.
- Recognize and be constantly alert for signs of heat stress. Signs of heat stress include rapid heart rate, labored breathing, feeling of weakness, and excessive sweating, or hot, flushed dry skin. Consult your safety officer or physician to learn and recognize the signs of heat stress.
- Be particularly alert for signs of heat stress during warm and/or humid weather.
- At the first sign of heat stress, immediately seek medical help.



**DANGER**

**Wearing your protective ensemble, garment, or any PPE may increase your risk of heat stress, which may cause heart attack, stroke, dehydration, or other conditions resulting in death, injury or illness. At the first sign of heat stress, immediately seek medical help.**



**DANGER**

**Wearing your protective ensemble, garment, or any PPE may increase your risk of losing mobility, functioning, or cause entanglement that can impair your ability to operate that can lead to death or injury. Understand and recognize how your protective ensemble or protective garments can potentially impair your mobility and function.**

## Loss of Mobility or Function

Wearing of your protective ensemble, including your garment and even when worn correctly, may limit your ability to move easily, manipulate objects, see clearly, and communicate with others. You must be aware of the effects of your protective ensemble on your ability to perform certain tasks and compensate in ways that do not compromise your safety or increase your risk of death, burns, injuries, diseases, or illnesses.

You must also be aware that your protective ensemble or portions of your protective ensemble may prevent you from entering certain confined spaces, restrict your movement in other ways, or result in you becoming caught on or entangled in equipment, implements, or rough areas of the response environment.

## Wet, Soiled, Contaminated, and Damaged PPE

Wet, dirty and/or contaminated protective clothing and equipment can be a breeding ground for germs, bacteria, fungus, and other microorganisms that can cause disease and illness. Your protective garments must be kept as dry and clean as possible in order to reduce the risk of infections, diseases, and illnesses. Protective clothing that has been exposed to biologically contaminated water, such as flood water that may contain sewage, must be sanitized after exposure to prevent further growth of microbial contamination.

If your protective garment becomes slightly dirty or contaminated, do not use it. Dirt or contaminants reduce your garment's protective qualities and increase your risk of death, burns, injuries, diseases, and illnesses. Many soils on the exterior and interior layers permit material to reflect less and absorb more heat. These soils can also lead to clothing being easier to contaminate. Clean your protective garment in strict compliance with NFPA 1857, 2026 Edition, with this guide, with manufacturer's instructions, and with all Federal, state and local government environmental regulations and health codes.

Do not use chlorine bleach or low pH (< 6.0) or moderately high pH (>9.5) detergents or cleaning agents when cleaning your protective garment, as their use may reduce the strength of or degrade your protective garment. If you are unsure whether or not your protective garment is free of contaminants or dirt, do not use it. Do not use garments that are not thoroughly clean and dry.

Common damage to protective garments includes physical damage such as rips, tears and cuts, broken or missing hardware and closure systems, thermal damage in the form of charring, burn holes, melting or discoloration of any layer, damaged or missing reflective trim, loss of seam integrity and broken or missing stitches, and loss of liquid integrity (observed leakage) for barrier garments. Even if your protective garment becomes slightly damaged or degraded, do not use it. Tears and worn, abraded areas, and broken seams greatly decrease your protective garment's protective qualities and increase your risk of death, burns, injuries, diseases, and illnesses. You and your department or employer should regularly inspect your protective garment for signs of wear and tear and to ensure that the garment has not been modified or altered in any way. Even the most harmless looking changes to the protective garment may increase your risk of death, burns, injuries, diseases, and illnesses.

**DANGER**

**Do not use your protective garment if it is wet, soiled, or contaminated. Such use may result in death, burns, injuries, diseases, or illnesses. Arrange for proper cleaning and sanitization or decontamination before use.**

**DANGER**

**Do not use your protective garment if it is physically or thermally damaged or improperly altered from its original condition. Such use may result in death, burns, injuries, diseases, and illnesses. Repair (if appropriate) or replace your protective garment before use.**

## Skin Allergies

The wearing of your protective garment may produce skin allergies if you are allergic to specific substances used in the materials of protective garment or become sensitized to these substances over time. The susceptibility of each individual is different; most individuals do not experience any allergic effects. The wearing of your protective garment, especially under hot and sweaty conditions, may cause changes in your skin health and make your skin more susceptible to effects by different emergency scene contaminants. Further, the accumulation of different contaminants in your protective garment may become a source of skin reactions and allergies if your protective clothing is not kept clean. If you experience any unusual skin reactions or allergies that you cannot explain, contact your supervisor and seek medical help.

## Improper Fit, Wearing, or Coverage



### DANGER

**Your protective garment must be properly sized, worn with all closures secured, and cover the intended areas of your body to provide limited protection. Your garment should fit, be properly adjusted, with layers and accessories used and be properly in place. Failure to do so may result in death, burns, injuries, diseases, or illnesses.**

Before each use of your protective garment, make sure that it is sized and adjusted to fit properly. Your protective ensemble should fit you so that it does not restrict your movement (see “Loss of Mobility or Function” above). All of the items that you wear with your protective garment should fit together with your other equipment so that the overall protective ensemble protective layers overlap in all body positions. Do not allow gaps in coverage of your body by your protective equipment. As you change your body position, check to make sure that your protective garment’s protective layers continue to overlap. You should go through a range of body motions and orientations to ensure that your protective garments correctly fit, do not impede specific movements, and that the interface areas with other items such as your hood, gloves, and footwear maintain full coverage of your body. If your weight or body size changes, your protective ensemble must be refitted or adjusted accordingly.

You must fasten all closures (flaps, buttons, hooks, zippers, collars, etc.) on your protective garments to reduce your risk of death, burns, injuries, diseases, and illnesses. If you do not fasten all closures, there will be gaps in your protection or items may get into pockets that cause dangerous conditions. For example, an open collar may permit hot debris to get under your protective garment and burn you. Similarly, an unfastened protective coat may open up and expose you to radiant heat or toxic substances. Failure to fasten all closures and utilize all components may result in death, burns, injuries, diseases, and illnesses.

## Hazards Based on Your Position and Operating Area

### Traffic and Vehicle Hazards

Activities that distract your full and undivided attention to approaching traffic are a common physical hazard encountered by firefighters and other emergency personnel. Your protective ensemble, including your protective garment, is not designed to protect you if you are struck by a vehicle or involved in a vehicle accident. You should always be seated and wear a seat belt when riding in a moving vehicle. You should not operate on or near a roadway without receiving training in the proper way of doing so and without appropriate protective equipment. Exercise extreme caution when operating on or near a roadway or around vehicular traffic. The high visibility materials that may be part of your protective garment are not always adequate for you to be seen by approaching traffic or equipment. You may be required to wear supplemental high visibility safety apparel that is appropriate for your operations. Your operating conditions may further prevent adequate visibility to drivers or equipment operators from seeing you.

### Other Operating Area Hazards

In addition to the hazards described above, which are by no means an all-inclusive list of potential hazards that you might face, you need to be aware that you can encounter hazards that are specific to the circumstances under which you are performing firefighting or emergency operations. Specific hazards include, but are not limited to:

- **Bodies of water.** Exercise extreme caution around bodies of water. Your protective ensemble does not float and may make swimming difficult.
- **Elevated areas.** Exercise extreme caution when operating on roofs, balconies, ladders, and other elevated areas. Your protective ensemble does not protect you from falls. You must be provided with adequate fall protection, which is not addressed in this guide.
- **Moving machinery.** Exercise extreme caution when working around moving machinery. Even with high visibility materials as part of your protective ensemble, you may not be seen by approaching equipment. Your operating conditions may further prevent adequate visibility to equipment operators. Also be alert to the potential that part of your garment may be caught in operating machinery.



**DANGER**

**Without appropriate levels of high visibility materials, your protective garment may not comply with visibility requirements for working on a roadway. It will not protect you if you are struck by a vehicle or in a vehicle accident. You should receive training on proper emergency operations conducted on or near roadways and the appropriate protective equipment for doing so. Be constantly alert to the possibility of vehicle hazards.**

**Always remain seated and wear a seat belt while riding in a moving vehicle. Failure to do so may lead to death, burns or injuries.**

# Chapter 3

## Use and Limitations of Protective Clothing

OSHA places the responsibility for selection, approval, maintenance, inspection, and training in the proper use and limitations of safety gear on your fire department or employer (Title 29, Code of Federal Regulations, Section 1910.132). By doing this, OSHA recognizes a simple truth: how you use your protective ensemble is beyond the manufacturer's control. Your fire department or employer controls the circumstances under which you use the protective ensemble and is in the better position to assess the hazards at the fire or emergency scene and to direct the appropriate selection and use of safety equipment including protective ensembles.

Consistent with the OSHA regulations, manufacturers offer your protective ensemble for your fire department (paid or volunteer) or employer to evaluate and decide whether or not the protective ensemble provides an acceptable level of protection for any particular fire or emergency operation. Your department or employer should ensure proper fit and conduct its own testing, evaluation and training in conjunction with qualified safety experts before issuing protective garments for use by its emergency responders or firefighters.

Matters that your department or employer at the fire scene should consider on a case-by-case basis include:

- Whether to use a protective garment in a specific emergency response.
- The extent of your emergency response activities.
- Areas of the response scene where you can safely operate.
- How long your protection can be safely maintained under the emergency response conditions.

Because the manufacturer of your protective garment cannot predict the many varying conditions existing at each fire or emergency scene, your department or employer must decide the appropriate use of your protective ensemble and its suitability for that use at each fire scene. The manufacturer makes no guarantees or warranties, express or implied, that your protective ensemble is fit for a particular purpose. (See Warranty Information on inside back cover.)

Use your protective ensemble only under the direct supervision of your fire department or employer in a manner consistent with applicable versions of NFPA 1550 Standard on Emergency Responder Health & Safety, other relevant NFPA standards, 29 CFR 1910.132, and 29 CFR Part 1910.1030, as applicable.

# NFPA Label

The NFPA label on your protective garment states that your garment is compliant with the requirements in NFPA 1950, 2025 Edition standard for one of the following product areas:

- Technical Rescue Protective Garment.
- Technical Rescue Protective Garments Meeting the Optional Liquid Barrier Protection Requirement.
- Emergency Medical Protective Multiple-Use Garment.
- Wildland Firefighting Protective Garment.
- Wildland Firefighting and Urban Interface Firefighting Garment.
- Non-liquid Barrier Multifunctional Protective Garment.
- Liquid Barrier Multifunctional Protective Garment.

Your protective garment product label may include additional statements of compliance or warnings dictated by NFPA 1950. For example, each type of garment may have additional statements indicating if the garment contains electrical circuitry that meets separate non-incendive or intrinsically safe criteria. Emergency medical garments also include a separate warning for operating in areas of vehicular traffic when high visibility materials are incorporated into the garment design.

Compliance and labeling with the NFPA 1950 standard do not mean that you cannot be seriously injured if you use the protective garment only for the respective mission(s) addressed in the standard. Even if you limit yourself to specific missions – technical rescue incidents, emergency medical operations, and wildland or urban interface firefighting – you are still at risk of death, burns, injuries, diseases, and illnesses as described on the garment's label and in this guide. As previously explained, there is no such thing as a “routine” or “ordinary” emergency or fire, and you must realize that you are at risk at all times during emergency and firefighting operations.

Both your protective coat and protective pants or protective coveralls will have a label. The label on your protective garment will include certain information:

- The name of the manufacturer and their address, including their country.
- A garment identification number, which may be a unique serial number or a lot number.
- The month and year of manufacturer (some labels may provide also provide the day).
- A serial or number or other information identifying the specific clothing item for purposes of traceability.
- The model or style name, number, or design.
- The size or size range of the garment, as applicable.
- Identifications for the principal materials of construction
- Cleaning precautions.
- A statement indicating compliance with the 2026 Edition of NFPA 1950 or earlier edition of the NFPA 1971 standard, depending on its date of manufacture. All protective garments manufactured after July 2026 are required to meet the 2026 edition. The mark (logo) of the certification organization should be present on the label of any certified garment.

- Additional information may also be provided by the manufacturer.

The above information may appear on multiple labels that generally will be adjacent to one another on the garment. These labels appear on a protected area of the garment generally on the interior of the garment. If your technical rescue protective garment has a separable liner, a separate label will also be provided for the liner with at least the product serial number and the materials of construction.

# Donning and Doffing

## Donning Your Protective Trousers

1. Slip on protective trousers and footwear so that all components or layers of each trouser cuff completely cover and overlap the upper part of each boot. Be sure that the overlap remains in all body positions during use.
2. Sit and bend over to check and adjust for comfortable fit. Undertake additional movements such as squatting to further ensure comfort.
3. Fasten fly and all covers leaving no openings or gaps.
4. Fasten all snaps and other closures.
5. Make sure that all components, layers, accessories, and other items provided by the manufacturer are in place.
6. Ensure proper fit, with no tightness or gapping.

## Donning Your Protective Coat

1. Put on the protective coat so that the inner flap is properly aligned and fasten all closures so that the closure area is smooth with no openings or gaps.
2. Place your coat collar in the fully extended, "up" position.
3. Secure collar closure completely covering the collar opening. Be sure there are no gaps in coverage.
4. Ensure that all components, layers, accessories, and other items provided by the manufacturer are in place. If pockets have closure flaps, ensure that flaps are in a closed position or that items in the pocket do not prevent the flap from being properly closed.
5. Ensure that all layers of your protective coat overlap all layers of your protective trousers by at least 2 inches in all body positions.
6. Ensure proper fit, with no tightness or gapping.



### WARNING

**How you don and doff your protective garments affect your life and safety. You must also wear the protective garment properly in order for it to reduce your risk of death, burns, injuries, diseases, and illnesses. You must also exercise caution when you remove your protective garment to avoid contaminating yourself and others with hazardous substances.**

**Do not wear your garments if they have not been cleaned or are damaged. Seek replacement garments if your garments are soiled or damaged. Wearing an unclean or damaged garments will increase your risk of death, burns, injuries, diseases, and illnesses.**

## Donning Your Protective Coveralls

1. Slip on trouser portion as above.
2. Slip on coat portion as above.
3. Refer to any specific manufacturer instructions for design variations in your protective garments. Protective coveralls, while having similar features as separate coats and trousers will fit differently and do not require an assessment of the coat to pant overlap.

## Doffing Your Protective Garments

Doffing procedures vary depending on whether or not your protective garments have been contaminated during use.

When emergency doffing is required, immediately seek assistance to remove protective garments as quickly as possible, taking care to avoid having unprotected skin or under clothing come in contact with any portion of the garments or other protective ensemble elements.

### No Contamination

1. If there is no contamination, remove your protective garments in reverse order from the procedures described above for donning the protective garments.
2. Inspect each item of the protective garments any damage or change in condition.
3. If you see damage or a change in condition, bring this to the immediate attention of your fire department or employer. Such damage or change in condition must be corrected before you may use your protective garments.
4. If no damage or change is noted, store your protective garments as recommended in this Guide under "Storage".

### Contaminated Protective Garments

Doff protective garments contaminated with fireground soils, blood, body fluids, toxins, radioactivity, chemicals, and/or hazardous materials with special care by taking the following precautions:

- Avoid unprotected bodily contact with any contaminated area of your protective ensemble.
- Use appropriate protective clothing for handling contaminated garments (See current versions of NFPA 1950 (1999) and NFPA 1581 for procedures and types of garments and equipment to be used in handling protective garments contaminated with biologically hazardous materials. See current version of NFPA 1891 for similar information concerning chemical hazards.)
- Avoid spreading the contaminants from your protective garments to your personal belongings, your living quarters and/or interior spaces in buildings and vehicles.



## WARNING

**Avoid unprotected bodily contact with contaminated areas of your protective garments.**

**Avoid contact between contaminated protective garments and your personal belongings, your living quarters and/or interior spaces in buildings and vehicles. Such contact may increase your risk of death, burns, injuries, diseases, and illnesses.**

- Remove your protective garments in reverse order from that described above for donning the protective garments. Account for any changes in the doffing procedures that are the result of other parts of your entire ensemble being contaminated (e.g., gloves).
- Place contaminated protective garments in a sealable, leak-proof, airtight bag so it can be subjected for cleaning. Avoid keeping your contaminated garment in the bag for an extended period of time to avoid the growth of mildew.
- Dispose of contaminated protective garments that cannot be adequately cleaned or decontaminated in accordance with applicable Federal, state and local laws.
- If you intend to reuse your protective garments, it must be cleaned and decontaminated in accordance with the instructions found in this guide before you or anyone else may have unprotected bodily contact with it.

## Modifications, Alterations and Markings



### WARNING

**Modifying, changing, adding to, marking, painting, or altering your protective garment in any way may affect its protective qualities and increase your risk of death, burns, injuries, diseases, and illnesses.**

Do not modify, change, mark, paint, or alter your protective garment without the manufacturer's written authorization. This includes placing emblems or patches on the exterior of the garment that may not have the necessary qualities and compromise the protective qualities of your garment, making any modifications to permit better fitting, or removing any component or feature with which the protective garment was provided to you.

Do not write over top of any printed information on the protective garment product labels. Do not remove your protective garment label. If your protective garment label becomes damaged or unreadable, contact the manufacturer for a replacement label.

# Chapter 4

## Inspection

# General Inspection Requirements and Warnings

Inspect your technical rescue and wildland or urban interface firefighting garments regularly in accordance with NFPA 1857, 2026 Edition. Inspect your emergency medical protective garment in accordance with Annex C of NFPA 1950, 2025 Edition and NFPA 1891, 2022 Edition.

## Universal PPE Handling Precautions

NFPA 1857 requires that universal precautions be observed when handling garments and other clothing and equipment. This means that you should always assume the protective garment you are handling is contaminated, even when it does not appear soiled or has obvious visible contamination. At a minimum, individuals conducting inspections should wear examination gloves or cleaning/utility gloves certified to NFPA 1950 (1999).

- If you have the potential for extended or repeated contact with heavily soiled or contaminated garments, you should wear:
- An apron with sleeves or coverall that meets the single or multi-used requirements of NFPA 1950 (1999).
- An N95 or higher filtering facepiece respirator approved by NIOSH.
- A faceshield is also recommended.

Similarly, if the garment is contaminated with blood or other potentially infectious fluids (including flood water), wear a sleeved apron or coverall, respirator, and facemask.

## Types of Inspections

NFPA 1857 (1855) establishes requirements for both routine inspections and advanced inspections for technical rescue garments. NFPA 1857 (1877) only establishes general inspection requirements for garments used for wildland and urban interface firefighting. For emergency medical garments, NFPA 1891 (2022) distinguishes requirements for inspections depending on the disposition of the garment. The following subsection shows differences in the type and frequency of inspections.



### WARNING

**You must inspect your protective garments regularly for evidence of damage or changes. If you are uncertain about the condition of your protective garments, do not wear them and seek assistance from the appropriate person in your fire department or organization.**

**Failure to regularly inspect your protective garments increases your risk of death, burns, injuries, diseases, and illnesses.**

## Technical Rescue Garments

- Individual users routinely must inspect their own protective garments when obtained, at the beginning of each duty period and before and after each use.
- Independent service providers (ISP) or personnel in your fire department or organization who have received training in the inspection of protective garments must conduct advanced inspections at a minimum of once every 12 months or whenever routine inspections indicate that a problem could exist.

Independent service providers (ISP) must receive verification according to the criteria in NFPA 1851, 2020 edition. Personnel conducting inspections of protective garments must have written verification of training from the original manufacturer or verified ISP.

## Emergency Medical Garments

Inspection procedures in NFPA 1891, 2022 edition indicate conducting inspections of garment for the following disposition of the garment:

- Upon receipt.
- Prior to donning the garment.
- Following use, cleaning, and decontamination.
- Following repairs.
- Annually or periodically.

This standard leaves it up to the department or organization to set the frequency of the inspection, though recommends at least one year.

Given the similarity between multi-use emergency medical garments and technical rescue garments and the absence of detailed inspection criteria for emergency medical garments, apply the same inspection practices above for technical rescue garments to emergency medical garments.

## Wildland and Urban Interface Firefighting Garments

NFPA 1857 (1877) requires inspections of protective garments to be conducted at the time of issue, after each use, or at a minimum of every 12 months, to be conducted by either individual members or members who have been trained to perform the inspection. NFPA 1857 (1877) also permits the organizations to have inspections conducted by verified independent service providers (ISPs), ISPs, or contracted organizations that meet the department's standard operating procedures for conducting inspections. No specific requirements exist for inspecting garments after cleaning or repairs, but this practice is recommended.

# Routine Inspections

You and your fire department or employer should inspect your protective garments upon receipt. You are responsible to inspect your garments upon issue, at the beginning of each duty period, after each cleaning, and before and after each use of any kind.

Inspect your protective garments for:

- Soiling.
- Contamination.
- Physical damage such as, but not limited to, rips, tears, and cuts.
- Damaged or missing hardware and closure systems and their components.
- Thermal damage such as charring, burn holes, melting, or discoloration of any layer.
- Damaged or missing reflective trim.
- Loss of seam integrity and broken or missing stitches.

In examining your protective garments, examine all readily visible areas of the garment, including the shell, components on the shell such as trim, hardware, reinforcements, and pockets, and the liner (if present).

Remember, whenever you have a question about the condition of the protective garments, you should temporarily remove the questionable garment from service and refer to the manufacturer, a verified independent service provider (ISP), or other competent, trained organization for evaluation.

Your fire department or employer must develop and use standards and guidelines for determining whether or not your protective garments pass inspection and can continue to be used for firefighting and emergency operations.

If an inspection discloses any damage or deterioration to any protective garment, do not use it and do not attempt to repair it. Consult your fire department or employer as to the proper steps to be taken in dealing with the damaged protective garment.

# Advanced Inspections

For technical rescue garments and as recommended for emergency medical garments, advanced inspections apply to are the responsibility of your fire department or organization. Only trained individuals from your fire department or organization, or other individuals trained by a verified ISP can perform advanced inspections. Outside of your organization, advanced inspections can be performed by the garment manufacturer or a verified ISP. ISPs must be verified by meeting requirements established in NFPA 1857.

Qualified personnel should conduct advanced inspections at a minimum of every 12 months and whenever routine inspections determine potential damage. Advanced inspections should be performed more frequently as deemed necessary based on the condition of your protective garment or decisions made by your fire department or organization.

Advanced inspections involve a more detailed and thorough examination of your protective garments for different types of damage or changes. In addition to the item identified above for routine inspections, a more detailed assessment is made that includes:

- Physical damage to the liquid barrier layer on either side, including loose or missing liquid barrier material tape, delamination of the film from the substrate fabric, flaking or powdering, contamination or age.
- Evaluation of garment fit and coat/trouser overlap.
- Loss of material physical integrity [as may occur from ultraviolet (UV) light exposure or chemical degradation] as evidenced by discoloration, significant changes in material texture, decreased material strength, loss of liner material, and shifting of liner material (if applicable).
- Loss of wrist cuff elasticity, stretching, runs, cuts, or burn holes (if applicable).
- Reflective trim integrity, attachment to garment, reflectivity, or damage (if applicable)
- Label integrity and legibility
- Functionality and integrity of garment hardware, closures, liner attachment, and accessories (as applicable).

Advanced inspections also entail some limited non-destructive testing of your garment. For example, inspectors can examine the reflective qualities of trim on protective garments where reflective materials are present by testing the garment trim in a darkened area using a flashlight.



## WARNING

**Some trim may have lost its reflectivity (by being clogged with dirt or affected by heat and/or water) even though the deterioration is not visible under normal daylight conditions.**

# Limitations of Inspection

Though most performance properties of the protective garment cannot be tested adequately in the field, OSHA regulations require your department or employer to regularly inspect your protective garment and other safety equipment. Your fire department or employer should have a systematic, routine and regularly scheduled inspection of your protective garment and other equipment. Full documentation and records of these inspections should be kept.

# Record Keeping

NFPA 1857 (1855), 2026 edition requires that your fire department or employer compile and maintain records on your protective garment. The following records must be kept:

- Person to whom the protective garment is issued
- Date and condition of the garment when issued
- Manufacturer name and model name or design
- Manufacturer's identification number, lot number or serial number
- Month and year of manufacture
- Date and findings of advanced inspections
- Dates and findings of advanced cleaning, disinfection or sanitization, or specialized cleaning
- Reason for and who performed advanced cleaning, disinfection or sanitization or specialized cleaning
- Dates of repairs, who performed repairs and brief discussion of repairs
- Date of retirement
- Date and method of disposal

There are no detailed record keeping requirements for emergency medical garments. In the absence of these requirements, use the same procedures as for technical rescue garments.

- NFPA 1857 (1877) requires less information for record keeping, including the following records be kept for wildland and urban interface firefighting garments.
- Manufacturer name and model name or design
- Manufacturer's identification number, lot number or serial number
- Month and year of manufacture

Due to nature of wildland firefighting for some organizations, more detailed record keeping including the individual to which the garment is assigned and the dates and details for inspection, cleaning, decontamination, repairs, and retirement are not required.

# Chapter 5

## Cleaning and Decontamination

### General Cleaning Requirements and Warnings

It is important to keep protective garments clean and contamination free. Soiled or contaminated protective garments are a hazard to end users because fireground and emergency scene soils and contaminants can be flammable, toxic and/or carcinogenic. Additionally, soiled or contaminated protective garments can have reduced protective performance. Clean protective garments offer you better protection and proper cleaning and decontamination can add to the life of the protective garment; therefore, you should clean protective garments whenever they become soiled.

**The fire/emergency services and manufacturers have been working very hard to get the message across that contaminated and soiled protective clothing and equipment put firefighters and other emergency responders at a grave and unnecessary risk of death, burns, injuries, diseases, or illnesses. Several studies have concluded that cleaning the gear is a very important step towards helping protect the firefighter or emergency responder for a variety of reasons, not least of which, is to prevent continued exposure to carcinogen and other hazardous substances that stay with gear following its use on the fireground or during other emergency operations. You and your fire department or organization are responsible to keep your protective garments clean and maintain them as set forth in the garment label(s) and this guide.**

In everyday use, personal protective equipment becomes dirty by absorbing sweat from the wearer and soils, soot, and so forth from the outside environment. Cleaning of garments, other clothing, and equipment will assist in removing these substances. Protective garments can also become contaminated with other substances, principally hazardous materials, particulates, and body fluids or other potentially infectious materials. Different procedures must be followed for cleaning and decontamination processes to be fully effective.

# Health Risks of Soiled or Contaminated Protective Garments

Soiled or contaminated protective garments can expose wearers to toxins, carcinogens, and infectious agents that enter the body through ingestion, inhalation or skin absorption. Some forms of contamination can cause acute or short-term health effects, but others can occur from repeated exposures. Repeated small exposures to some contaminants can add up over time and cause health problems. Although safety is important to avoid injury or inhalation hazards while working at the emergency scene or on the fireground, your protective clothing can inadvertently absorb or carry many of the contaminants that lead to continued exposure and present health risks away from the fire scene from your handling and wearing of protective garments and equipment.

Based on their state (e.g., gas/vapor, liquid, or solid), contaminants encountered at an emergency or fire scene can get in or on protective garments in several different ways. Some substances including many chemical gases, vapors, or liquids can permeate into clothing materials and be adsorbed within the material. Liquids can also penetrate into or through materials and remain trapped in the material structure.

Likewise, very small solid particulates can penetrate fabrics and other materials and stay within the material unless removed by cleaning or decontamination. The tendency for contaminants to remain in clothing depends on the characteristics of the substances where volatile chemicals or gases may be transient and evaporate from materials over time while less volatile substances can be persistent. Some infectious agents can remain viable on textile or other surfaces for extended periods of time. It is important to recognize that many forms of contamination are not visible or discernible. Just because you cannot see or smell contamination does not mean that your protective garments are free of contamination.

Since cleaning and decontamination may not be fully effective in removing all contamination, you should further assume that protective garments are contaminated after any known exposures at a fire or other emergency scene, even following cleaning and decontamination. You must therefore minimize your handling of your protective garments and relegate their use only for emergencies where your fire department or employer require their use.

Failure to regard your protective clothing in this way increases your risk for death, injuries, illnesses or diseases arising from continued contact with potentially contaminated protective garments.



**DANGER**

**Due to potential levels of contamination that may not be removed through cleaning, you must limit your handling and use of your protective garments, even if cleaned and decontaminated, to those situations where your department or employer require their use. If you do not minimize your handling and use only when necessary, you increase your risk of death, injuries, diseases, and illnesses from potential continued exposure to contaminants.**

# Reduced Performance Hazards of Contaminated Protective Garments

Although less expected than for structural fires, technical rescue, emergency medical, or wildland firefighting protective garments can become laden with particles, contaminants and chemicals. These contaminants can cause problems other than exposing the end user that include, but not limited to, the following:

- Soiled protective garments typically reflect less radiant heat. After materials are saturated with hydrocarbons, they tend to absorb rather than reflect the radiant heat from the surrounding fire.
- Protective garments 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.
- Protective garments 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. Individual responders can still encounter various chemicals in their normal emergency activities, even if they are not directly involved in a response as part of a specialized hazardous materials response team. Exposures to oils, fuels and lubricants can also occur around fire station vehicles. During responses, exposures to liquids ranging from pesticides to acids to chemical solvents can occur, with or without your knowledge.
- These contaminants, in addition to being hazardous, can also degrade garments in the following ways:
  - Garment fabrics and other materials can become weakened and tear more easily.
  - Thread or seam sealing tape can become loose.
  - Flame retardant or water repellent treatments (if present) can be removed.
  - Visibility markings can become less visible and/or lose their fluorescent and retroreflective properties.
  - Garment hardware can become corroded.

## Other General Warnings

Do not wear or have soiled or contaminated garments inside in the living quarters of the fire station or other emergency station. Do not take soiled or contaminated garments home. Do not wash soiled or contaminated garments in home laundries or in public laundries unless the public laundry has a dedicated business to handle protective garments.

Do not transport soiled or contaminated garments in the passenger area of an emergency or personal vehicle.

Do not commercially dry clean your protective garments. Standard commercial dry cleaning involving hazardous chemical solvents is not recommended for cleaning protective garments. Some drycleaning and other solvents can damage components of protective garments. However, certain emerging processes using non-hazardous can be considered for cleaning if adequate information is available to show their safety of use, effectiveness in removing contaminants, and the absence of damage to protective garments or components. Consult with your protective garment manufacturer prior to dry cleaning or other cleaning process to learn whether or not a specific dry-cleaning process will damage your protective garments.

While similar cleaning instructions are provided for the garments addressed in this user information guide, some differences exist. In the absence of specific cleaning procedures for emergency medical garments, the same cleaning procedures for technical rescue garments are specified.



### WARNING

**Soiled or contaminated protective garments can expose not only you, but also fellow responders, family members and others to the contaminants and carcinogens described in this guide. To reduce the risk of death, injuries, diseases, and illnesses to you and others, do not take soiled or contaminated garments home or into living quarters.**

# Technical Rescue and Emergency Medical Garments

## Routine Cleaning

Per NFPA 1857 (1955), end users are responsible for carrying out routine cleaning of their issued garments **for only spot cleaning** using the following procedures:

1. Wear at least examination or cleaning gloves that meet NFPA 1950 (1999) criteria; also wear a sleeved-apron, and faceshield.
2. Evaluate the contamination levels and the need for cleaning of your protective garments at the emergency scene. If in the assessment of contamination, contamination is suspected, isolate the affected protective garments, place a tag on the garment indicating its suspected contamination, and place in a bag for advanced cleaning and decontamination. Refer to your supervisor or appropriate individuals in your department or organization for guidance.

Depending on the type and level of contamination, it may not be possible to fully clean and decontaminate your protective garments.

3. Isolate protective garments to prevent cross-contamination.
4. Initially brush off any dry debris and rinse garment exterior with water.
5. Do not use heavy scrubbing or spraying with high velocity water jets such as a power washer.
6. If necessary, use a soft bristle brush to gently scrub and then rinse off the garment again.
7. Pretreat any heavily soiled or spotted areas. Do not use chlorine bleach, chlorinated solvents, active ingredient cleaning agents, or solvents without the approval of the protective garment manufacturer.
8. Fill a utility sink with water. Do not use a water temperature in excess of 105oF (40oC).
9. Only use a mild detergent that has a pH range of not less than 6.0 pH and not greater than 9.5 pH as indicated on the product safety data sheet (SDS) or original product container.
10. Use protective gloves and eye/face splash protection while cleaning.
11. Gently scrub the protective garment using a soft bristle brush.
12. Thoroughly rinse the protective garment with clean water.
13. Conduct a routine inspection and where necessary the wash the garment or submitted for advanced cleaning. Consult the garment manufacturer if stronger cleaning agents are required.
14. Do not machine dry using equipment that produces mechanical action from tumbling or agitation. Instead, air dry the garments in an area with good ventilation and not in direct or indirect sunlight, under fluorescent lights, or under UV light.
15. Fully rinse the utility sink after cleaning the garment.

## Advanced Cleaning and Decontamination

Submit your protective garments for advanced cleaning if soiled or contaminated.

Advanced cleaning must be performed by the garment manufacturer, a manufacturer-trained organization, a verified organization, or a verified independent service provider (ISP). The level of necessary training is determined by the garment manufacturer, a verified ISP, or the organization.

Garments may be cleaned using either a washer/extractor or a manufacturer-approved non-water-based machine (such as carbon dioxide dry cleaning machine).

### Washer/Extractor-Based Advanced Cleaning

In the absence of specific cleaning and decontamination procedures from the garment manufacturer, use the following steps:

1. Wear at least examination or cleaning gloves that meet NFPA 1950 (1999) criteria; also wear a sleeved-apron, and faceshield.
2. Use a programmable washer/extractor that can set individual cycle lengths, water level, wash temperatures, and extraction times, and a machine that has an acceleration of less than 100 Gs. Do not use top loading machines, with or without a center post agitator.
3. For garments that have liners that can be separated, remove the liner from the shell, turn the liner inside out, and put it in a mesh laundry bag before washing.
4. Pre-treat heavily soiled or spotted areas. Do not use chlorine bleach, chlorinated solvents, active ingredient cleaning agents, or solvents without the approval of the protective garment manufacturer.
5. Fasten all closures, including pocket closures, hook and loop closure tape, snaps, zippers, and hooks.
6. Remove any tools or accessories from the garments.
7. Do not overload or underload the machine (generally machines should not be filled with clothing more than 70-80% of their capacity).
8. Do not exceed a water temperature of 120°F (49°C).
9. Set up the machine with detergent (suds) cycle, rinse cycles, and extractions based on the machine manufacturer's instructions.
10. Use mild detergents with a pH range of not less than 6.0 pH and not greater than 9.5 pH as indicated on the product Safety Data Sheet (SDS) or original product container. Do not use any cleaning agents or detergents that leave a residue or degrade garment materials or components.
11. Do not use a machine that exceeds an acceleration of 100 Gs (980 m/s<sup>2</sup>).



## WARNING

**Soiled or contaminated protective clothing ensembles can expose not only you, but also fellow firefighters, family members and others to the contaminants and carcinogens described in this guide. To reduce the risk of death, injuries, diseases, and illnesses to you and others, do not take soiled or contaminated elements home or into living quarters in your firehouse.**

12. Follow the specific machine manufacturer's instructions for proper setting or program selection for the protective garments you are washing. The specific formulation for the washer/extractor should include a series of steps for filling the wash basket, adding detergent, performing multiple rinses and including separate extractions between wash and rinse steps.
13. Inspect and rewash the protective garment if necessary.
14. Where the machine is also used to wash items other than protective ensemble elements, rinse the machine out by running the machine without a laundry load through a complete cycle filled to the maximum level with water at a temperature of 120°F to 125°F (49°C to 52°C), and detergent.
15. Dry the protective garment as described under Drying Procedures below.

## Non-Water-Based Machine Advanced Cleaning

Use the following procedures for a non-water-based machine washing:

1. Wear at least examination or cleaning gloves that meet NFPA 1950 (1999) criteria; also wear a sleeved-apron, and faceshield.
2. Follow the machine provider's instructions for the set up and programming of the specific equipment consistent with emergency response protective clothing.
3. Depending on the machine provider's instructions, it may not be necessary to separate liners from shells. If this is not the case, separate the liner from the shell, and turn it inside out, and put it in a mesh laundry bag before washing.
4. Do not overload or underload the machine. Refer the machine provider's instructions for determining how many garments can be cleaned at one time.
5. Pre-treat heavily soiled or spotted areas. Do not use chlorine bleach, chlorinated solvents, active ingredient cleaning agents, or solvents without the approval of the protective garment manufacturer.
6. Fasten all closures, including pocket closures, hook and loop closure tape, snaps, zippers, and hooks.
7. Remove any tools or accessories from the garments.
8. Use mild detergents or cleaning agents with a pH range of not less than 6.0 pH and not greater than 9.5 pH as indicated on the product Safety Data Sheet (SDS) or original product container. Do not use any cleaning agents or detergents that leave a residue or degrade garment materials or components.
9. Do not use a machine that exceeds an acceleration of 100 Gs (980 m/s<sup>2</sup>).
10. Follow the specific machine manufacturer's instructions for proper setting or program selection for the protective garments you are washing. The specific formulation for the washer/extractor should include a series of steps for filling the wash basket, adding detergent, performing multiple rinses and including separate extractions between wash and rinse steps.
11. Inspect and rewash the protective garment if necessary.

12. Where the machine is also used to wash items other than protective ensemble elements, rinse the machine out by running the machine without a laundry load through a complete cycle filled to the maximum level with water at a temperature of 120°F to 125°F (49°C to 52°C), and detergent.
13. Dry the protective garment as described under Drying Procedures below.

## Drying Procedures

Examine the manufacturer's label for any unique instructions on drying procedures specific to your protective garment. Where there are no unique manufacturer's instructions or manufacturer's approval of alternative procedures, use either air drying or a drying cabinet as the preferred methods, especially. While machine drying is generally not recommended, NFPA 1857 (1855), 2026 Edition does provide some guidance for when machine drying is to be used.

Air drying or use of a drying cabinet are the most appropriate methods for drying protective garments. They cause no mechanical damage and little or no shrinkage. For air drying, the most efficient method involves forced air ventilation. For this method of drying, simply use fans to re-circulate air inside a room where protective garments are drying. The basic drying room should include floor drains, a method to exchange the air to the outside environment, and drying racks for hanging protective s to provide maximum air exposure. Overall drying time is dependent on the efficiency of the drying room and the ambient conditions. Heating of the room or the inlet air at temperatures up to 100°F (38°C) can further improve the efficiency of the drying process. Drying protective garments in ambient air, as opposed to drying cabinets or drying rooms, can take a relatively long time depending on the ambient environmental conditions.

Most manufacturers do not recommend machine drying of protective garments. During operation, dryers can reach very high basket temperatures that may damage garments. Machine drying also includes mechanical action that can cause damage to protective garments.

Use the following steps, depending on the drying approach selected:

### **Air Drying**

1. Place garments in an area with good ventilation
2. Do not dry in direct or indirect sunlight, under fluorescent light, or under UV light.
3. Do not allow area used for drying to exceed temperature of 120°F (49°C).

### **Use of Drying Cabinet**

1. Place garments in drying cabinet to allow good air circulation between each garment.
2. Use a specific drying temperature and duration to provide sufficient drying time.
3. Do not allow area used for drying to exceed 120°F (49°C).

### **Machine Drying**

1. Do not exceed the recommended capacity of the machine.
2. Fasten all closures, including pocket closures, hook and loop, snaps, zippers, and hooks. All hook tape that is not part of the closure must be covered with loop tape.
3. Select a “no-heat” or “air dry” option, if available.
4. In the absence of a “no-heat” or “air dry” option, use a basket temperature (dryer temperature setting) that does not exceed 120°F (49°C).
5. Discontinue the use of a heat cycle prior to the removal of all moisture from the protective garment.
6. Accomplish the remainder of the drying process by a “no-heat” machine setting or removal of the protective garment from the machine dryer to air dry.
7. Protective clothing that is not completely dry should never be returned to service.

# **Wildland and Urban Interface Firefighting Garments**

## **Acceptable Cleaning Approaches**

NFPA 1857 (1877) sets the following requirements related to cleaning garments:

- The department organization has to have a means for providing PPE cleaning and decontamination.
- Contaminated garments cannot be brought into the home or washed in-home laundries.
- Public laundries can be used as long as a procedure to clean the machines after their use has been established.
- Commercial dry cleaning should not be used for either cleaning or decontaminating protective garments unless the process has been approved by the garment manufacturer.
- A contracted cleaner, ISP, or verified ISP can be used for cleaning protective garments. When a commercial cleaning service or ISP is used, it must demonstrate to the department or organization that it can properly clean and decontaminate protective garments without compromising the performance.
- Protective garments must be washed in accordance with the specific garment manufacturer’s recommendations and instructions.
- Contaminated protective garments must be either laundered in washing equipment dedicated solely for that purpose or disposed of. Contaminated garments can also be cleaned by an outside contracted service.

# Cleaning Procedures

## Acceptable Machine Types

Protective garments can be washed by one of the following machine types:

- Front load and top load washing machines with no agitator.
- Washer/extractors.
- Liquid carbon dioxide machines.

## Cleaning Precautions

Unless otherwise advised by the manufacturer's instructions, the following cautions must be applied when using either a washing machine or extractor:

- Do not use bleach.
- Double rents garments, at a minimum.
- Use a water temperature not greater than 49°C (120°F).
- Use a mild detergent with a pH range of not less than 6.0 pH and not greater than 9.5 pH as indicated on the detergent's safety data sheet or original container.

## Drying Methods

Dry garments in accordance with the manufacturer's instructions are one of the following procedures:

### **Air Drying**

- Place garments in an area with good ventilation.
- Do not dry garments in direct or indirect sunlight, under fluorescent light, or under UV light.
- Do not allow the area used for drying to exceed 49°C (120°F).

### **Use of a Drying Cabinet**

- Place garments in the drying cabinet to allow good air circulation between each garment.
- Use a specific drying time and drying temperature to provide sufficient drying time for the garments.
- Do not allow the area used for drying to exceed 49°C (120°F)

### **Tumble Drying (in a machine)**

- Fasten all closures of the garment.
- Use a "no heat" or "air dry" option, if available.
- In the absence of a "no heat" or "air dry" option, do not allow the basket temperature to exceed 49°C (120°F).

# Contract Cleaning

If an independent service provider (ISP), a manufacturer trained in cleaning, a verified cleaner or a verified organization cleans your protective garment rather than trained personnel of your fire department or employer, it is the responsibility of your fire department or employer to ensure that the contract cleaner is knowledgeable enough to provide adequate service and not cause damage to your protective garment. Contract cleaners must be able to provide documentation of their verification to effectively clean protective garments. Specific guidelines for making this determination are provided in Annex A (Section A.6.1.10) of NFPA 1857, 2026 revision.

# Chapter 6

## Repair

You must maintain your protective garments. The maintenance of your protective garment may occasionally require repairs. Maintenance must be performed as needed on worn areas, tears, missing stitches on all layers, hardware or other component detachment, permanent staining, and certain other conditions. Any loose stitches, any ripped areas and any detached trim or loose pockets must be repaired before the garment's next use. Because the performance of your protective garment is dependent on its condition and the quality of any repairs to improve its condition, only the original manufacturer, verified ISP, or a member of your fire department or the organization who has received training by the manufacturer or an ISP in the repair of protective garments can repair your protective garments.

Protective garments may require cleaning, when necessary, before any repair work is performed.

All repairs and alterations must be performed in the same manner and using like materials as used by the original garment manufacturer, including, but not limited to, the same fabric, thread type, seam construction, hardware, and hardware backing materials, unless a deviation is approved by the garment manufacturer. These repairs must use materials and components that are compliant with prevailing edition of NFPA 1950. Due to the different methods of construction, you, your fire department or employer must contact the original manufacturer if you are unsure of whether a repair can be accomplished without adversely affecting the integrity or protective qualities of your protective garment. Depending on the type of garment, the permitted repairs differ.



**DANGER**

**Do not attempt to repair your protective garments. Only the original manufacturer, a verified ISP, or member of your fire department or organization that has been trained by a manufacturer of the same garment type or an ISP should repair your protective garments. Improper repair of your protective garments may increase your risk of death, injuries, diseases, and illnesses.**

# Technical Rescue and Emergency Medical Garments

All repairs must be made in accordance with NFPA 1857 (1855), 2026 Edition by the original manufacturer, verified ISP, or member of the organization that has received training provided by the garment manufacturer or a verified ISP that provides the repair protective garments. As stated above, repairs must be made in the same manner and using the same materials as used in the original garment. If questions come up relative to the adequacy of the repair, contact the manufacturer for instructions.

NFPA 1857 (1855) distinguishes between basic repairs in advanced repairs. The differences between the two types of repairs are listed below:

## Basic Repairs

Basic repairs are limited to the following:

- Patching minor tears, char marks and ember burns to a separable outer shell
- Repairing skipped, broken and missing stitches to a separable outer shell
- Replacement of missing hardware, excluding positive closure systems to a separable outer shell
- Re-closing of the liner of a garment after an inspection.

NFPA 1857 (1855) permits these repairs if limited to certain sizes of damage. Certain Basic repairs are only permitted for non-liquid barrier technical rescue garments.

## Advanced Repairs

Advanced repairs can only be performed by the garment manufacturer, a verified organization, or a verified ISP. Trained individuals of an organization cannot conduct these repairs. These repairs include:

- Repairs to the liquid barrier of the protective garment.
- Restitching more than an inch of the major garment seams.
- Replacement of zippers and other closure materials.



### WARNING

**If your protective ensemble is contaminated, you must follow procedures mandated by Federal, state and local law for handling and/or decontaminating your protective elements. Failure to do so may increase your risk of death, burns, injuries, diseases, and illnesses. Protective elements that are contaminated by CBRN terrorism agents must be immediately retired after confirmed exposure and shall not be subjected to cleaning or decontamination.**

**Read and follow the doffing warnings and instructions in this guide to reduce your risk of death, burns, injuries, diseases and illnesses.**

# Wildland and Urban Interface Firefighting Garments

Wildland and urban interface firefighting garments can be performed by the manufacturer, a verified organization, a verified ISP, and ISP, a contracted entity that meets the requirements of the organization's SOP for repair, or member of an organization was received training in the repair of the protective garments and is responsible for performing or managing specialized repairs. Individual firefighters should not repair their own garments.

NFPA 1857 (1877) provides criteria for different repairs by qualified entities or individuals including:

- Repair of small minor tears, char marks, ember burns or abraded areas that are less than 25 in.<sup>2</sup>
- Replacement of trim (visibility materials).
- Replacement of hardware.
- Replacement of zippers.
- Replacement of hook and loop tape.
- Replacement of reinforcements.

# Chapter 7

## Storage



### WARNING

**Garment not in use shall not be exposed to lighting that emits UV rays.**

**Do not store your protective garment:**

- **In fluorescent lighting, direct or indirect light, especially sunlight or expose your protective garment to direct light when not being worn**
- **When wet or with any layers that are moist**
- **In contact with potential contaminants**
- **Under temperature extremes**

**Improper storage may reduce the effectiveness of your protective garment and increase your risk of death, burns, injuries, diseases, and illnesses.**

Store your protective garments properly to maximize its service life, minimize effects that may diminish its performance and reduce potential health hazards. Improper storage may result in permanent damage to your protective garment and increase your risk of death, burns, injuries, diseases, or illnesses.

## Storage Limitations

Prolonged exposure to direct light, especially sunlight, can degrade the performance properties of materials used in your protective garments.

The presence of moisture in your protective garments can promote the growth of mildew, fungus, bacteria, or other harmful microorganisms that cause skin irritation, rashes, diseases, or illnesses, and may also reduce the performance properties of your protective garments. It is important to keep your protective garments away from contact with potential contaminants, including but not limited to oils, solvents, acids, or alkalis. These substances can also create health hazards for wearing protective garments and reduce the performance properties of your protective garments.

Your protective garments must not be stored at temperatures below  $-32^{\circ}\text{C}$  ( $-25^{\circ}\text{F}$ ) or above  $82^{\circ}\text{C}$  ( $180^{\circ}\text{F}$ ). Prolonged storage of your protective garments to temperature extremes can reduce the performance properties of your protective garments.

Sharp objects, tools or other equipment can physically damage your protective garments and reduce the performance properties of your garments. If protective garments must be stored or transported in environments where there are items that can potentially cause physical damage, use a protective case or bag to prevent damage. In addition, remove all sharp tools or other items from the pockets of protective garments following use to avoid subsequent damage to garments.



### WARNING

**Do not store or transport your protective garments in compartments or trunks with sharp objects, tools or other equipment that could damage your protective garments. Damaged protective garments can increase your risk of death, burns, injuries, diseases, and illnesses.**

# Recommended Storage Area and Conditions

Soiling and other substances on protective garments can lead to increased exposure and cause contamination of personal items if not segregated from personal areas. If protective garments must be transported or stored inside living quarters or within the passenger compartment of personal vehicles, the protective garments must be placed in a protective case or bag to prevent cross-contamination.

Issued garments items are not allowed in living quarters. Contaminated or soiled protective garments must not be transported in the cab of a fire department apparatus when not being worn for operational duties unless placed in an airtight protective case or bag to prevent cross contamination. If placed in a protective case or bag, the contaminated or wet protective garments should be removed from such environments as soon as possible following transport.

When protective garments items are being transported to a verified ISP or cleaning facility, use a plastic bag that is at least 2 mil (0.05 mm) thick that allows for ease of identification and ensures that items are not accidentally discarded.

Store your protective garments in an area that is:

- Clean, dry and well ventilated
- Out of direct sunlight or not exposed to other sources of ultraviolet radiation (such as fluorescent lights)
- Not subject to temperature extremes
- Away from sharp objects, tools or other equipment that can physically damage garments
- Free of potential contaminants



## WARNING

**Do not store your protective garments inside living quarters or with personal belongings. Do not transport your protective garments within the passenger compartment of personal vehicles. Failing to properly store and transport your protective garments can expose you and others to toxic and carcinogenic contaminants and increase the risk to you and others of death, injuries, diseases, and illnesses.**

# Chapter 8

## Retirement and Disposal

### Retirement



#### DANGER

**Using a garment beyond its useful life compromises your protection. Retired protective garments are not suitable for continued use in any emergency activities.**

**Do not use any protective garments that should be retired or that have been retired for any firefighting or emergency activity. Doing so increases your risk of death, burns, injuries, diseases, and illnesses.**

Pursuant to OSHA regulations, your fire department or employer must determine whether or not your protective garment is ready for retirement and replacement. The actual service life of each garment varies depending on the amount of use and how well it has been cleaned and maintained. Depending on the type of garment, NFPA 1857, 2026 Edition may require that you must retire your protective garment if is older than by a specific number of years past the date the garment was manufactured. These retirement limits are indicated below:

- Technical rescue garments must be retired at 15 years following the date of the manufacture.
- Technical rescue garments with optional liquid barriers must be retired at 10 years following the date of manufacture.
- No specific maximum service life is specified for emergency medical garments, but NFPA 1950 Annex C requires that the organization set criteria for when a garment should be retired.
- No specific maximum service life or retirement age is specified for wildland and urban interface firefighting garments. NFPA 1857 (1877) requires the organization to determine when a garment should be removed from service based on the specific manufacturer's instructions and the experience of the organization.

Even when a maximum service life is established, your protective garments may require retirement earlier than the mandated number of years. The service life of your garments depends on many factors, including, but not limited to, how you and your fire department or employer use, care for and maintain your protective garments. The frequency and conditions under which your protective garments are used will further affect the service life of your garments. Factors related to removing a garment from service include:

- Wear or damage of the garment to the extent that it is too costly to repair.
- Contamination of the garment where it is either too costly to decontaminate or is it not possible to fully decontaminate the garment.

The responsibility for deciding when to retire and replacing your protective garments rests with your fire department or employer. This decision must be made by trained personnel working under the direct supervision of your fire department or employer.

# Disposal

If retired, your protective garment must be destroyed or disposed of in a manner that ensures that the garment cannot be used in any firefighting or emergency activities, including live fire training. Acceptable methods of disposal include, but are not limited to, cutting the clothing in pieces or stapling the clothing together in a manner in which the staples cannot be removed and the clothing cannot be worn.

NFPA 1857 (1855) permits using retired technical rescue garments in nonemergency training if your organization or employer determines that the garments are not contaminated, defective, or damaged. For such use of a retire garment, the protective garment must appropriately be marked for nonemergency training only.

NFPA 1857 (1877) does not permit use of any retired wildland and urban interface firefighting garment for any firefighting, emergency activity, or training.



**DANGER**

**Do not attempt to repair your protective gloves. Only the original manufacturer, a verified ISP, or member of your fire department or organization that has been trained by a manufacturer of the same element type or an ISP should repair your protective gloves. Improper repair of your protective gloves may increase your risk of death, injuries, diseases, and illnesses.**

# Chapter 9

## Special Incident Exposures

**NOTE:** If you are involved in firefighting or other emergency activity where serious injuries or fatalities occur, contact your supervisor to determine the disposition of your protective clothing and equipment, including your protective garments, before using these items following the incident.

Your organization or employer must have procedures in place for handling and maintaining the custody of protective elements that are directly related to serious firefighter or emergency responder injuries or fatalities that include at least the following:

- Immediate removal from service and preservation of the protective element(s) involved.
- Custody of the protective element(s) involved in a secure location with controlled, documented access.
- Non-destructive tagging and storage of protective element(s) in paper or cardboard containers (plastic containers must not be used).
- Examination of protective element(s) by qualified members of your organization or employer, the garments manufacturer or outside experts.

Your fire department or employer must set a specific time period for how long the protective elements, including protective garments, must be retained.

# Chapter 10

## Other Information

### Warranty

Your protective garment is warranted by the manufacturer to be free from defects in material and workmanship. This warranty does not cover normal wear or unusual exposures. This warranty is in lieu of all other warranties, expressed or implied, including, but not limited to, implied warranties of marketability and/or fitness for a particular use. Repair or replacement for breach of this warranty shall be the exclusive remedy available. The manufacturer shall not be liable for incidental or consequential damages.

### Replacement Guides

Keep this Official User Information Guide in a safe place and refer to it regularly. Replacement guides for your protective garments may be obtained from the manufacturer. Contact the manufacturer if you lose this guide.

You can also obtain a User Guide online by going to <https://www.femsa.org/uig/categories/view/?id=3>

Keyword: **1950garments**

Text Keyword to: **63975**

### Contact Information

The manufacturer contact information is provided on the protective garments label. If you need further information to reach a manufacturer, contact the Fire and Emergency Manufacturers and Services Association, Inc. (FEMSA) online at [info@femsa.org](mailto:info@femsa.org).

# References

NFPA Standards. NFPA standards may be obtained from the National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269 (800-344-3555 or 617-770-3000); standards may also be ordered on line at [www.nfpa.org](http://www.nfpa.org). Below is a sample of some, but not all, available NFPA standards:

- NFPA 1550, *Standard on Standard for Emergency Responder Health and Safety*
- NFPA 1581, *Standard on Fire Department Infection Control Program*
- NFPA 1850, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural and Proximity Firefighting and Open-Circuit Self-Contained Breathing Apparatus (SCBA)*
- NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting [consolidated into NFPA 1850]*
- NFPA 1891, *Standard on Standard on Selection, Care, and Maintenance of Hazardous Materials, CBRN, and Emergency Medical Operations Clothing and Equipment*
- NFPA 1950, *Standard on Personal Protective Equipment for Technical Rescue Incidents, Emergency Medical Operations, and Wildland and Urban Interface Firefighting*
- NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents [consolidated into NFPA 1950]*
- NFPA 1970, *Standard on Protective Ensembles for Structural and Proximity Firefighting, Work Apparel, Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services, and Personal Alert Safety Systems (PASS)*
- NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting [consolidated into NFPA 1950]*
- NFPA 1990, *Standard on Protective Ensembles for Hazardous Materials and CBRN Operations*
- NFPA 1999, *Standard on Protective Clothing for Emergency Medical Operations [consolidated into NFPA 1950]*
- NFPA 2500, *Standard for Operations and Training for Technical Search and Rescue Incidents and Life Safety Rope and Equipment for Emergency Services*

Federal Regulations. Copies of Federal regulations may be obtained from the U.S. Government Printing Office, Washington, DC 20402 (202-512-0000). Free copies of government regulations may be obtained on line at [www.gpoaccess.gov](http://www.gpoaccess.gov)

- Title 29, Code of Federal Regulations, Section 1910.120, "Hazardous Waste Operations and Emergency Response"
- Title 29, Code of Federal Regulations, Subpart I — Personal Protective Equipment, Sections 1910.132 through 1910.140
- Title 29, Code of Federal Regulations, Section 1910.1030, "Bloodborne Pathogens"

# GLOSSARY

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

**Advanced Cleaning.** See definition of Cleaning.

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

**Carcinogen/Carcinogenic.** A cancer-causing substance which is identified in one of several published lists, including, but not limited to, those prepared by the U.S. National Toxicology Program, the International Agency for Research on Cancer (IARC), the National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH).

**Care.** Cleaning and storage of protective clothing and equipment.

**CBRN.** An abbreviation for chemicals, biological agents, and radiological particulate hazards.

**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).

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

**Cleaning.** The act of removing soils and contamination from garments by mechanical, chemical, thermal, or combined processes.

**Advanced Cleaning.** The act of removing both soiling and contamination generally associated with products of combustion.

**Routine Cleaning.** The light cleaning of protective garments performed by the end user without taking the garment out of service.

**Specialized Cleaning.** The act of removing specific hazardous materials, soiling associated with body fluids, or other forms of contamination

**Cleaning Facility.** An entity, location, or site engaged in the cleaning of garments and other protective clothing that includes an garment manufacturer verified in cleaning, a verified cleaner, a verified organization or a verified ISP.

**Confined Space Entry.** An activity of rescue that takes place in a space that is large enough and so configured that a person can bodily enter and perform assigned work, that has limited restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits), and that is not designed for continuous occupancy.

**Contamination.** The accumulation of products of combustion and other hazardous materials on or in a protective garment that includes carcinogenic, toxic, corrosive, or allergy-causing chemicals, body fluids, infectious microorganisms, or CBRN terrorism agents.

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

**Decontamination.** The act of removing contamination from or neutralizing contamination in protective clothing and equipment.

**Emergency Medical Operations.** Delivery of emergency patient care, including patient transportation when provided, prior to arrival at a hospital or other health care facility. Patient care includes, but is not limited to, first aid, cardiopulmonary resuscitation, basic life support, and advanced life support.

**Ensemble.** The collection of protective clothing and equipment worn by an individual firefighter or emergency responder to provide complete protection during a specific emergency operation or type of firefighting.

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

**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.

**Flammable or Explosive Atmospheres.** Atmospheres containing solids, liquids, vapors, or gases at concentrations that will burn or explode if ignited.

**Fluorescence.** The process by which radiant flux of certain wavelengths is absorbed and reradiated, nonthermally in other, usually longer, wavelengths.

**Functional.** The ability of an garment or component of the garment to continue to be utilized for its intended purpose.

**Hardware.** Non-fabric components of the protective clothing and equipment include, but not limited to, those made of metal or plastic.

**Hazardous Materials.** A substance (solid, liquid or gas) that when released is capable of creating harm to people, the environment and property. Hazardous materials are any solid, particulate, liquid, gas, aerosol, or mixture thereof that can cause harm to the human body through respiration, ingestion, skin absorption, injection, or contact.

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

**Independent Service Provider (ISP).** An independent third party utilized by an organization to perform advanced cleaning, advanced inspection, and repair services. In order to comply with NFPA 1851, an ISP must be verified. See also Verified Independent Service Provider (ISP).

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

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

**Liquid Barrier Layer.** The component of the garment that is intended to provide protection from hazardous liquids.

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

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

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

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

**Multifunctional Protective Garments.** Protective garments that are designed to meet the protection needs of technical rescue incidents, emergency medical operations, and wildland and urban interface firefighting

**NFPA.** National Fire Protection Association.

**Organization.** The entity that provides the direct management and supervision for the emergency services personnel. See also Manufacturer-Trained Organization and Verified Organization.

**OSHA.** The United States Occupational Safety and Health Administration.

**Outer Shell.** The outermost component of the garment, not including trim, hardware, reinforcing material, pockets, wristlet material, accessories, fittings, or suspension systems.

**Particulates.** Finely divided solid matter that is dispersed in air.

**Products of Combustion.** The end product when fuels, such as hydrocarbons and materials, remain after the process of combustion in a fire.

**Retirement.** The process of permanently removing a garment from emergency operations service in the organization.

**Retroreflective.** The reflection of light in which the reflected rays are preferentially returned in the direction close to the opposite of the direction of the incident rays, with this property being maintained over wide variations of the direction of the incident rays.

**Sanitizer.** A type of antimicrobial agent that is used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health regulations.

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

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

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

**Service Life.** The period for which compliant product may be useful before retirement.

**Soiling.** The accumulation of sweat, dust, dirt, debris, and other nonhazardous materials on or in a garment that could degrade its performance or cause hygiene issues.

**Spot Cleaning.** The application of a cleaning agent or process that is focused on a small area of the protective garment to remove persistent, heavy soiling or contamination.

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

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

**Technical Rescue Incidents.** Complex rescue incidents requiring specially trained personnel and special equipment to complete the mission.

**Universal PPE Handling Precautions.** An approach used in the handling of protective clothing and related items where the assumption is made the protective garment or item is contaminated and potentially hazardous if handled by individuals who are not adequately protected.

**Urban Interface Firefighting.** Activities of fire suppression and property conservation within areas of housing or other structures/improvements that are either intermingled or abut vegetation or forest.

**Verified Independent Service Provider (ISP).** An independent service provider verified by a third-party certification organization to conduct advanced inspection, advanced cleaning and sanitization, basic repair, and advanced repair service.

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

**Wildland Firefighting.** The activities of fire suppression and property conservation in woodlands, forests, grasslands, brush, prairies, and other such vegetation, or any combination of vegetation, that is involved in a fire situation but is not within buildings or structures.

**Wildland/Urban Interface (WUI).** The line or zone where structures and other development meet or intermingle with undeveloped wildland or vegetative fuels and the area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.

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



# PERSONAL RESPONSIBILITY CODE



**DANGER**

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called on to use.
3. It is your responsibility to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions and care of any equipment you may be called upon to use.
4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. It is your responsibility to know that your equipment is in operable condition, fits properly, and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns, injury, diseases, and illnesses.



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# COPY OF PRODUCT LABEL



**DANGER**

**DO NOT USE THIS PROTECTIVE GARMENT IF YOU HAVE NOT READ AND UNDERSTOOD THE ENTIRE *FEMSA OFFICIAL USER INFORMATION GUIDE* AND ALL LABELS FOR FIREFIGHTING PROTECTIVE GARMENT!**

Firefighting and other emergency activities where this protective garment may be used are ULTRAHAZARDOUS, UNAVOIDABLY DANGEROUS activities. Neither this garment nor any other will protect you from all burns, injuries, diseases, illnesses, conditions, or hazards, any of which may cause death. No protective garment can replace proper training and constant practice in firefighting/emergency activity tactics and safety. Consistent with OSHA regulations, you, your department or employer must conduct a hazard assessment and determine if this garment provides an acceptable level of protection for your operations in firefighting or any emergency activity.

- You will increase your risk of DEATH, BURNS, INJURIES, DISEASES OR ILLNESSES if you do not strictly comply with the entire FEMSA OFFICIAL USER INFORMATION GUIDE and all LABELS. These consequences may occur with NO WARNING and NO SIGN of damage to this garment.
- Wearing this or any protective garment may increase your risk of heat stress which may cause heart attack, stroke, dehydration, or other conditions resulting in DEATH, INJURIES OR ILLNESSES.
- You may NOT feel heat under this garment before suffering a BURN, even when contacting a hot surface. This garment will lower your ability to feel heat and you may be burned underneath the garment with NO warning and NO sign of damage to the garment. Be constantly alert to the possibility of exposure to heat and other hazards.
- Do NOT use this garment if it is soiled, contaminated, damaged, worn out, or altered from its original condition. Do NOT use this garment unless it has been properly inspected and maintained by your fire department or employer consistent with the edition of NFPA 1850.
- Wear this garment ONLY with all layers and components in place and ONLY with all garment closures secured (if appropriate). This garment may include special features or be part of an overall ensemble of clothing and equipment. You MUST properly deploy all features and wear ALL ensemble components consistent with the specific manufacturer instructions.
- This garment is NOT warranted to be fit for a particular purpose. Read carefully the "Warranty Information" in the FEMSA OFFICIAL USER INFORMATION GUIDE.

If you do not have a FEMSA OFFICIAL USER INFORMATION GUIDE, contact the manufacturer.



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