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.

www.femsa.org

PROTECTIVE GARMENTS

FOR STRUCTURAL FIREFIGHTING AND PROXIMITY FIREFIGHTING

2025

Official User Information Guide

Protective Garments for Structural and Proximity Firefighting

www.femsa.org

#S2000RH

2025 Revision

Contents

Chapter 1

Introduction

This FEMSA Official User Information Guide provides warnings, information and instructions related to the selection, care and maintenance of your protective garments designed for structural firefighting or proximity firefighting.

Where a part of this guide specifically provides information on proximity garments, 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 firefighting and emergency operations 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.

DANGER

Structural and proximity firefighting and emergency operations 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.

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 both:

- The NFPA 1851 portion of the NFPA 1850, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural and Proximity Firefighting and Open-Circuit Self-Contained Breathing Apparatus (SCBA), 2026 Edition.

The NFPA 1971 portion of 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), 2025 Edition.

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

It is important for you to refer to NFPA 1850, 2026 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 1970 and NFPA 1850

Significant changes have been made in both the product standard defining minimum requirements for firefighting protective garments (NFPA 1970) and the end user standard (NFPA 1850) 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 1970 (for protective garments)

Some significant changes were made to the garment requirements compared with the prior 2018 Edition of NFPA 1971; these changes include:

- The NFPA 1971 requirements were combined with requirements for work apparel (NFPA 1975), SCBA (NFPA 1981), and PASS (NFPA 1982) into a consolidated standard – NFPA 1970. Structural and proximity garment within the 1971 portion of NFPA 1970.
- The outer shell, moisture barrier, thermal barrier, and wristlet material that are the principal textile and barrier film-based materials used in the construction of garments must now be tested for over 300 restricted substances and show levels below established maximum thresholds.
- Additional optional requirements are specified for labeling that indicates that the same materials identified above do not contain intentionally added per- or polyfluorinated alkyl substances (PFAS).
- A new test for assessing the stress impact of clothing was added that is called “evaporative resistance,” sometimes referred to as “Ret.” Like total heat loss (“THL”), this test measures the “breathability” of the garment composite, but uses a slightly different test approach that yields different rankings of garment material systems. The implementation of this system impacts some available composites for protective garments.

- Outer shells will be tested for continued tear resistance after direct UV light exposure as well as diesel fuel repellency, absorption, and penetration with follow-on testing for residual flame resistance. No specific acceptance criteria are set for these tests, but they are intended to inform decisions on the newer industry outer shell materials offerings.
- Some existing moisture barrier test requirements were either relaxed or modified such as changing one of the liquid penetration test chemicals, allowing a less rigorous test for moisture barrier viral penetration resistance, and evaluating the moisture barrier heat resistance and UV light degradation resistance in composite form. These changes were made to encourage non-PFAS moisture barrier alternatives.
- Other tests and related requirements have been modified to allow improved assessment of relevant garment or material properties. Some of the ways that materials are conditioned to replicate field use have been updated. A more realistic method has been established to evaluate the ability to deploy and use the garment Drag Rescue Device ("DRD").
- Optional (non-mandatory) tests have been introduced to allow the assessment of outer shell, moisture barrier, and thermal barrier materials for ease of contamination in terms of percent semi-volatile organic compound and heavy metals when cleaned using industry standard washer/extractor-based procedures.
- More information will be available on the label and user information to describe the compositions of major materials used in the construction of protective garments.

New or Modified Requirements for within NFPA 1850 (for protective garments)

The primary revisions affecting selection, care, and maintenance of protective garments from the prior 2020 Edition of NFPA 1851 include:

- NFPA 1851 related to structural and proximity firefighting protective ensembles was combined with NFPA 1852 on SCBA as a new consolidated NFPA 1850 standard.
- Fire departments and organizations are required to appoint individuals as Personal Protective Clothing (PPC) Manager and PPC Technician(s) with specific roles and responsibilities for managing and undertaking the care and maintenance of protective ensemble items.
- Fire departments and organizations are required to provide training on the new edition of the NFPA 1850 standard within one year following the date it is issued (by September 2026).
- Detergents and other cleaning agents used in the cleaning of protective garment cannot have a pH lower than 6 (slightly acetic) or higher than 9.5 (moderately alkaline). The older maximum pH was 10.5
- Wash and drying temperatures are now permitted to be up to 120oF (15oF higher than before).
- Use of hard water (hardness > 60 ppm) must be avoided (not previously addressed on; hard water is known to make contaminant removal less efficient).

- Even if the protective garments are unused, they must be subject to an advanced inspection at least after 3 years following the prior inspection.
- Washer/extractors used in cleaning protective garments must be routinely cleaned and disinfected.
- Other machine-based cleaning technologies are permitted as long as the different machines and processes can meet cleaning verification requirements.

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.

DANGER

This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

This red and red border represent Safety Red

WARNING

This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

This grey and grey border represent Safety Orange

CAUTION

This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

This white and black border represent Safety Yellow

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 are 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, liner, and drag rescue device (DRD,

and poor fit. You may need to further inspect and evaluate certain elements 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 1850, dictates a mandatory retirement for structural gear of ten years from the date of manufacture. Outer shells for proximity garments must be retired five years from the date of manufacture. However, this should not be construed as meaning that all protective clothing will last for ten years (or five years). 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.
- Do not under 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 1970 (1971), NFPA 1550, NFPA 1581, NFPA 1850 (1851), NFPA 1950 (1951, 1977, and 1999), NFPA 1990, 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 29 CFR 1910.132-140, "Personal Protective Equipment," and 29 CFR.1910.156, "Fire Brigades"). You must understand the content of these publications.

Training by Your Fire Department or Employer

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

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 structural or proximity firefighting protective ensembles) 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 emergency worker?	☐ Yes ☐ No
2.	Have you read and do you understand all warnings, precautions, directions, and instructions contained in this FEMSA Official User Information Guide?	☐ Yes ☐ 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?	☐ Yes ☐ 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?	☐ Yes ☐ 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?	☐ Yes ☐ No
6.	Before using your new protective garments, have you inspected them and established that they fits you properly as outlined in the FEMSA Official User Information Guide?	☐ Yes ☐ 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?	☐ Yes ☐ No
8.	Do you understand that 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?	☐ Yes ☐ 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?	☐ Yes ☐ 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?	☐ Yes ☐ No

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

Chapter 2

Selection Considerations

Selecting your firefighting protective ensembles 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.

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 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.

Selection for Purchase

Prior to starting the selection process for structural firefighting ensembles and ensemble elements and proximity firefighting ensembles and ensemble elements, your fire department or employer must perform a risk assessment. The risk assessment must include, but not be limited to, the hazards that firefighters can encounter, based on the following:

- Type of duties performed
- Distinguishing response activities for different potential incidents
- Organization's experience
- Incident operations
- Geographic location and climate
- Specific physical area of operations
- Likelihood of CBRN terrorism incident
- Need for two sets of ensemble elements or spare ensemble elements

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 protective ensembles and ensemble elements. This hazard assessment identifies the specific hazards that firefighters may encounter and involves a determination of the appropriate personal protective equipment to protect individuals against those hazards.

Each fire department or organization uses a different process for the selection of PPE for structural and proximity firefighting. As a minimum, this process must ensure that the protective ensemble and ensemble elements comply with the applicable version of NFPA 1971, Standard on Protective Ensembles for Structural and Proximity Fire Fighting or the new consolidated standard, NFPA 1970.

A fire department or organization may consider a number of other factors in their selection of PPE that include the level of insulation, the stress impact of the clothing on individual firefighters, and the compliance of the products with federal, state, and local regulations related to certain restricted substances (chemicals that are limited in their use as ingredients in different product materials due to human health, toxicity, or environment concerns).

General requirements are provided in NFPA 1850 (1851) for fire departments or organizations to take into account when they choose specified protective garments and other protective clothing.

Additional Protective Garment Selection Factors Suggested by NFPA 1970 (1971)

PFAS Content in Protective Garments

The new NFPA 1970 standard permits manufacturers for protective ensemble elements, including protective garments, to be labeled as not having intentionally added per- and polyfluorinated alkyl substances (PFAS). If this claim is made for the specific garment, it will appear as follows:

THIS PROTECTIVE GARMENT UPON CERTIFICATION HAS A PFAS (TOTAL FLUORINE) CONCENTRATION OF NO MORE THAN 100 PPM.

This is an optional claim for the manufacturer to provide as part of the product certification label. There are several important aspects of this label to understand:

- The ability for the manufacturer to make this claim is based on independent testing of the principal textile or barrier materials, which include only outer shells, moisture barriers, thermal barriers, and wristlets or garment/glove interface components, for total fluorine that measures 100 ppm or less.
- Other materials or components that are used in the garment construction such as trim, reinforcement layers, facings, elastic, and hook and loop fastener are NOT required to be tested.
- Total fluorine is a proxy for total amount of PFAS in the materials and will tend to overreport the level of PFAS because fluorine may be found in other chemicals present in the material that are not considered PFAS but the testing does not distinguish between PFAS and non-PFAS chemicals that contain fluorine.
- The level of 100 parts per million (‘ppm”) is an arbitrary level that is agreed to distinguish whether PFAS has been intentionally added. This level may or may not coincide with state or local restrictions.
- If it is important to have a further understanding of this label claim, contact the manufacturer for more information.

Composite Thermal Protective Performance (TPP)

- The primary minimum level of insulation of protective garments against exposure to heat is determined by a thermal protective performance (TPP) test. This evaluation is conducted for the principal three layers of the garment composite that include the outer shell, moisture barrier, and thermal barrier.
- TPP measures the time to a predicted second degree burn injury when the garment composite is exposed to a heat flux level that is representative of a flashover or backdraft that is produced by a combination of direct flame exposure and radiant heat.
- The test produces a TPP rating in Watts per square centimeter of material. Higher ratings mean more insulation. However, **while the predicted time can be derived from the TPP rating, the predicted second degree burn time should never be used for determining a safe time for heat exposure.** This is because the single set of test conditions for measuring TPP is only one among an infinite range of different thermal conditions, which are constantly changing and include several other factors. TPP testing and results do not account for these different factors
- Areas of the ensemble that have additional layers beyond the 3-layer composite almost always have greater TPP ratings, but these areas are not required to be evaluated and, in some cases, will exceed the capabilities of the test to provide accurate measurements.
- Increased TPP comes at the expense of or as a tradeoff with other performance properties, mainly the physiological stress-related impacts of heavier or less breathable garments.

Composite Total Heat Loss (THL) and Evaporative Resistance (Ret)

- The physiological-stress impact of garments is partly assessed by garment composite tests that measure breathability, or how well clothing materials can release heat. Though it is recognized that under the hot conditions of being in a structural fire, heat can only transfer from the environment to the firefighter, protective garments are worn outside the fireground and any release of body heat before high exposures can aid in limiting increases in core temperature that impacts your safety.
- Total heat loss (THL) and evaporate resistance (Ret) are related to the physiological stress impact of garments. THL attempts to measure how much heat transfers from your body through the garment to outside environment by both conduction and sweat evaporation. Ret focuses solely on heat loss by sweat evaporation but is conducted under different environmental conditions.
- For THL, high values are better while for Ret, lower measurements show better breathability. Nevertheless, lower breathability is no guarantee that heat stress will not occur.
- Since both THL and Ret are measured on the 3-layer garment composite, where additional layers are present, breathability will usually be lower.
- In general, but with exceptions, higher THL (lower Ret) comes at the expense of having lower TPP ratings, but minimum requirements are set in the NFPA 1970 to provide a range of composites and tradeoffs between heat loss and heat protection.

Conductive and Compressive Heat Resistance (CCHR)

- It is important that some areas of protective garments have additional layers because these portions of the garment are subject to compression, which reduces the heat insulation in those specific areas.
- Conductive and compressive heat resistance (CCHR) measures heat transfer through certain reinforced areas of the garments that are subject to compression. For protective coats, this includes the shoulder areas where the weight of the self-contained breathing apparatus (SCBA) pulled down on the firefighter shoulders. The knee area of protective pants is also evaluated since firefighters often stay low on the fireground by kneeling.
- CCHR testing is conducted with the reinforced areas pressed down on a hot plate a high pressure. The liner of the composite is also moistened to simulate sweating in since it is known that some levels of wetness in material layers result in faster heat transfer.
- Manufacturers may have other areas reinforced that are reinforced but these areas may or may not be tested for CCHR.
- Even with compliant CCHR performance, firefighters can still be burned in tested areas because the exposure conditions are in excess of the conditions used for testing among other factors related to the specific fireground exposure.

Transmitted and Stored Heat Energy (SET)

- Compression of protective garments against the firefighter's body during a structural fire can also result in more rapid heat transfer leading to potential burn injuries under certain conditions. Certain denser material on the exterior of the clothing, particularly trim affixed to protective coat sleeves, can absorb and store heat more readily than the outer shell itself.
- This heat transfer can also be affected when moisture from sweating is trapped beneath the dense material on the liner of the protective coat.
- Transmitted and stored heat energy, sometime referred to as SET ("stored energy test"), measures the likelihood of a predicted burn injury in areas of garment sleeves that applied to the exterior of the outer shell of protective garment sleeves.
- This test measures the amount of heat transfer that occurs when respective sleeve area of the garment is subjected to an extended moderate level of radiant heat and is then suddenly compressed against the firefighter's skin. Longer times indicate greater insulation against these circumstances for the reinforce coat sleeve material composites.
- Rapid transfer of stored energy can still occur through evaluated areas as well as in other parts of protective garments as fireground conditions can exceed testing conditions and other aspects of the exposure contribute to overwhelming protective capabilities.

Flame Resistance Following Fuel Exposure

- New to the 2025 edition of NFPA 1970/1971, outer shell flame resistance is measured when exposed to a small volume of diesel fuel. These results show if the material will support ignition and continued burning both before and after cleaning. No specific criteria are set, but the results are reported by the protective garment manufacturer.
- The test also yields the percentages of diesel fuel that are repelled, absorbed, and penetrate the outer shell; these quantities are also simply reported without the establishment of any limits.
- While the results of this testing are intended to inform fire departments and firefighters how an outer shell material responds to a splash of diesel fuel, the test by no means represents all types of fuels and all conditions of exposure. The test and results do not imply a level of safety but instead are for comparison purposes only.

Outer Shell Tear Resistance Following UV Light Exposure

- A second “report only” requirement for in the 2025 edition of NFPA 1970/1971 is the tear resistance the outer shell following an extended exposure to UV light.
- Tear resistance is one the key measures that demonstrated the durability of outer shell materials for field use. Historically, outer shall materials have been evaluated before and after 10 cycles or hot water-based washing.
- NFPA 1970 (1971) now evaluates tear resistance after a larger number of launderings in combination with a moderate level of heat exposure, and repeated flexing, where the material must meet the original requirement.
- The material is separately exposed to UV light with reporting of the results for information purposes only without having to meet specific minimum criteria.
- Decreases in tear resistance test results indicate that long exposures to UV light reduce outer shell strength.
- Outer shell materials passing the new harsher tear resistance criteria may still break down under a variety of field exposure and use conditions. You must routinely inspect your protective garments for evidence of damage that include high levels of wear and thinning of fabrics.

Ease of Cleaning for Outer Shell, Moisture Barrier, and Thermal Barrier

- Another new “report only” requirement is the cleaning effectiveness for specific outer shell, moisture barrier, and thermal barrier materials used in protective garment composites.
- Cleaning verification methods specified in the NFPA 1851 standard are used on individual materials to evaluate how well individual representative fireground contaminants are removed using standardized washer/extractor procedures.

- Results are reported for each individual contaminant and as the average by group of contaminants (semi-volatile organic compounds or heavy metals) on a scale of 0 to 100%, indicating the percentage of contaminant removal. Higher levels indicate more effectively cleaned materials.
- As with other tests where results are reported for information purposes, the findings from this testing are for information purposes only and do not infer a specific level of safety.

Further Sources of Information for Test Results

Check with your manufacturer for further descriptions and information related to the above and other tests of interest from the NFPA 1970 (1971) standard, particularly for interpreting differences between material test results and how report only test information can be used in selecting protective garments.

Types of Protective Garments

Garments certified to NFPA 1970 (1971), 2025 Edition are required to meet several specific design criteria that affect how both structural and proximity firefighting protective garments are configured. Some of important requirements include:

- A composite with an outer shell, moisture barrier, and thermal barrier. Composites can be one or more layers.
- A means for attaching the moisture barrier and thermal barrier to the outer shell along with the allowable distance the liner materials must have with the outer shell at different hems and edges of the protective garment.
- A closure design that ensures garment integrity for continuous thermal and moisture protection.
- The use of positive locking closures (hooks and dees and zippers versus snaps or hook and loop fastener tape).
- Hardware that is free of rough spots, burrs, or sharp edges and that does penetrate through all layers of the composite to permit contact with the firefighter.
- Inherently flame-resistant thread.
- A means for allowing drainage of cargo pockets.
- The installation of a drag rescue device (DRD) that is accessible from the exterior and can be deployed to aid in the extrication of an incapacitated firefighter.
- A wristlet on the end of coat sleeves.
- A collar that when extended is at least 3 inches high.
- Minimum areas of reinforcement in the shoulder areas of the protective coat and knee areas of the protective pants.
- The availability of minimum sizing for protective garments in different increments for key dimensions of coats and pants.

Both structural and proximity firefighting garments are also subjected to many different performance requirements based on specific test methods:

- Whole garments are evaluated for liquid integrity
- Drag rescue devices (DRDs) are evaluated for easy and effectiveness of deployment. DRD materials are tested for strength.
- Composites are tested for thermal protective performance (TPP).
- Most materials are individually evaluated for flame and heat resistance. Different criteria apply to certain components.
- Outer shell, moisture barrier, and thermal barrier materials are evaluated for thermal shrinkage resistance and tear resistance.
- Moisture barrier and thermal barriers are tested for cleaning shrinkage resistance.
- Outer shells are also tested for water absorption resistance.
- Moisture barriers are also tested for water penetration resistance and UV light degradation resistance while both moisture barriers and their seams are tested for liquid penetration resistance and viral penetration or liquid-borne pathogen resistance.
- Outer shell, moisture barrier, and thermal barrier seams are tested for breaking strength.
- Garment composites in the shoulder and knee areas are evaluated for conductive and compressive heat resistance (CCHR).
- Hardware is tested for heat resistance and corrosion resistance. Zippers are tested for breaking strength.
- Hook and loop fastener tape is tested for breaking strength, shear strength, and peel strength.
- Labels are evaluated for continued legibility after laundering, heat exposure, and abrasion.

Structural Firefighting Garment Design and Performance

Structural firefighting protective garments are also required to include a minimum surface area of retroreflective and fluorescent trim in certain minimum configurations.

Performance criteria unique to structural firefighting protective garments include testing of:

- Composite total heat loss (THL) and evaporative resistance (Ret) for breathability.
- Trim nighttime and daytime brightness.
- Outer shell cleaning shrinkage.
- Garment coat composites with external reinforcements for transmitted and stored heat energy.
- Outer shell fuel exposure flame resistance, repellency, absorption, and penetration (report only)
- Outer shell, moisture barrier, and thermal barrier easy of cleaning.

Proximity Firefighting Garment Performance

Trim is not permitted on proximity firefighting garments. Instead, external surfaces entail an aluminized outer shell over nearly the entirety of the protective garments. A limited amount of reinforcement material is permitted as reinforcements on coat sleeve cuffs and pants leg cuffs.

Separate performance requirements specific to proximity protective clothing include testing for outer shell radiant protective performance, resistance to delamination, durability of adhesives, flex durability, and high temperature blocking.

Selection for Use

Prior to using structural and proximity firefighting protective ensembles and ensemble elements, it is essential to understand the differences in types of firefighting and the protective ensembles available for use.

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. Use of an unsuitable protective ensemble 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.

Types of Firefighting and Emergency Operations

Structural firefighting is the physical 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 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.

Examples of fires that commonly produce high levels of radiant heat, as well as convective and conductive heat, and could result in incidents incorporating proximity firefighting operations include, but are not limited to, bulk flammable liquid fires, bulk flammable gas fires, bulk flammable metal fires, and aircraft fires. These operations usually are exterior operations but might be combined with interior operations.

Proximity firefighting is not structural firefighting but may be combined with structural firefighting operations. Proximity firefighting also is not entry firefighting. Unlike entry firefighting, proximity firefighting does not involve direct entry of firefighters into flames. Proximity operations are performed close to the actual fire, where the high levels of radiant heat as well as the convective and conductive heat would overcome the thermal protection provided by structural firefighting protective ensembles. The proximity firefighting protective ensembles provide enhanced protection from these thermal and radiant exposures.

Entry firefighting involves extraordinarily specialized firefighting operations that can include rescue activities, fire suppression and property conservation at incidents involving fires producing extreme levels of radiant, conductive and convective heat. Examples of fires that commonly produce extreme levels of convective, conductive and radiant heat and could result in incidents incorporating entry firefighting operations include, but are not limited to, bulk flammable liquid fires, bulk flammable gas fires, bulk flammable metals, and aircraft fires. Highly specialized thermal protection is necessary for people involved in such extraordinarily specialized operations due to the scope of these operations and because direct entry into flames is made. Usually these operations are exterior operations, outside of structures. Entry firefighting is not structural firefighting or proximity firefighting. **Therefore, your protective garments are not suitable for this type of firefighting.**

Other types of specialized emergency operations include, but are not limited to, hazardous materials emergencies, emergency medical operations, urban search and rescue operations, wildland firefighting and water rescue operations. Each of these types of operations involves unique hazards and require specialized types of protective ensembles that are generally not met or optimal for the use of structural firefighting protective clothing. Regardless, it is up to your department, organization, or employer to make the decision about what operations and emergencies your protective ensemble, including your protective garments, can be used for.

DANGER

This guide does not address the protection provided by structural or proximity firefighting protective ensembles that are certified for protection from CBRN Terrorism Agents. This guide does not address and there are no recognized consensus standards for entry firefighting protective ensembles. Use of structural or proximity ensembles in these situations may lead to death, burns, injuries, diseases, and illnesses.

Firefighting Protective Ensembles

An ensemble includes all your protective clothing and equipment intended to provide protection against different hazards. This ensemble consists of different ensemble elements that must work together to provide protection from some risks, but not all risks, of emergency incident operations.

Structural firefighting protective ensembles include, at a minimum, protective garments (coat and pants or coveralls), a protective helmet, protective gloves, protective garments, and a protective hood. Each of these elements must be certified to the respective structural firefighting protective element requirements of NFPA 1970(1971), 2025 Edition.

Proximity firefighting protective ensembles include protective garments (coat and pants or coveralls), a protective helmet with a shroud, protective gloves, and protective footwear. Most organizations also use a protective hood. Each of these elements must be certified to the respective proximity firefighting protective element requirements of NFPA 1970 (1971), 2025 Edition.

Each ensemble also includes other equipment such as respiratory protection (i.e., SCBA), communications equipment, and other devices to provide protection from some risks, but not all risks, associated with emergency incident operations.

NFPA standards exist for different types of ensembles used at other emergency incident operations, including but not limited to technical rescue incidents, (NFPA 1950 [1951]), hazardous materials and CBRN operations (NFPA 1990), wildland firefighting (NFPA 1950 [1977]) and emergency medical operations (NFPA 1950 [1999]). The new NFPA 1950, 2025 Edition standard provides requirements for protective

clothing and ensembles for technical rescue incidents (NFPA 1951), emergency medical operations (NFPA 1999), and wildland firefighting (NFPA 1977). A separate standard (NFPA 1990) is provided for CBRN and hazardous materials protective ensembles. These standards have significantly different requirements as compared to those in NFPA 1970 (1971). Your department is responsible for determining the suitability of specific ensembles for specific emergency operations.

Firefighting and Other Emergency Hazards

DANGER

Protective ensembles addressed in this guide do not protect against all hazards and under all circumstances of use. Use of a protective ensemble 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.

It is essential that you understand the different types of ensembles and the limitations of protective ensembles to protect against potential hazards. The list of potential hazards that you may encounter during firefighting and other emergency operations 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 firefighter.

Where specific aspects are specifically related to protective garments, additional information is provided and is highlighted in pink.

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.

Thermal Hazards

Thermal hazards represent extremes of temperatures and heat energy. 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.

Your protective ensemble does not protect you from all burns and injuries. There are limits to the protection your protective ensemble can provide.

Though your protective ensemble reduces your risk of burns or injuries, you can still be seriously burned or injured underneath your protective ensemble with no sign of damage to your protective ensemble elements.

Burns are a function of time and amount of heat transferred to the body. You can be burned in relatively low temperature environments if your protective ensemble is exposed to heat or flames for long periods of time. Similarly, you can be burned over a very short time if your protective ensemble is exposed to relatively high temperatures. Scientists have plotted the times at which different amounts of heat cause human skin to burn on what is called the "burn curve." Whether or not your skin ever reaches the "burn curve" is a function of many variables, some of which are listed below.

Your protective ensemble is made of heat-resistant materials. Even though you may not notice any burn damage to your protective ensemble element, you can still be burned suddenly and without warning. Heat can build up and be stored in your protective ensemble element to the point where your skin burns. Your skin burns at temperatures far below the burning point of your protective ensemble. Do not be misled by the absence of thermal damage to your protective ensemble. Even without such damage, you may still be burned suddenly and without warning.

DANGER

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

DANGER

If your protective ensemble comes in contact with flames, a hot environment or hot object, you may be burned beneath your protective ensemble with no warning and no sign of damage to the protective ensemble. Be constantly alert to the possibility of exposure to flames, a hot environment, hot objects and other hazards.

Conductive Heat Burns

Conductive heat is transferred by direct contact with the heat source. Examples of conductive heat transfer would be standing or kneeling on a hot floor, leaning against a hot wall or coming into contact with flames or hot debris. Depending on the conditions, this sort of contact can burn you underneath your protective ensemble element with no advance warning and no sign of damage to your protective ensemble.

Suppose, for example, you lean your shoulder against a hot wall at a fire scene. The heat passes from the wall to the shoulder of your protective ensemble by direct contact (conduction). The layers of materials in your protective ensemble are compressed by the weight of your body against the hot surface. If you remain leaning long enough, or if the heat is severe enough, the heat may build up in your protective ensemble and eventually pass through the compressed layers of your protective ensemble and burn your shoulder. The greater the temperature or rate of heat transfer at the surface, the less time it will take for the heat to build up in your protective ensemble and eventually pass through the protective ensemble to burn you. Similarly, a lesser heat source can burn you depending upon the length of time that you are exposed to it. How quickly this may happen depends on the length of exposure, amount of heat transferred, the specific materials used in the protective ensemble elements, the cleanliness and condition of the protective ensemble element, and other factors. Depending on conditions, you may not feel the heat buildup in your protective ensemble element before you are burned.

Radiant Heat Burns

Your protective ensemble does not have to be in direct contact with a hot surface or hot object in order for you to be burned. Heat can build up in your protective ensemble and pass through your protective ensemble as the result of exposure to radiant heat. For example, while fighting a fire you may be exposed to radiant heat for a period of time during which your protective ensemble absorbs the heat. Even if you did not compress the clothing system, or if you were to kneel or lean against a non-heated surface, the heat absorbed by the protective ensemble may still be great enough so that you are burned. Merely positioning your body so that the protective ensemble pulls tight against your body (as in squatting so that the knee area is pulled tight across the knees, raising your arm so that the shoulder is tight across your upper body, bending your elbow, etc.) can result in a burn because of compression.

You do not have to kneel or lean against a surface to be burned. You do not have to compress the layers of your protective ensemble to be burned. You may be exposed to a high enough level of radiant heat for a short enough time or a low level of radiant heat for a longer time that causes you to be burned with no compression of the protective ensemble. Depending on conditions, you may not feel the heat build-up in and/or pass through, your protective ensemble materials, before you are burned.

Convective Heat Burns

Convective heat is transferred by hot gases. Although you may be burned by direct contact with flames, you do not have to contact flames to be burned. If your protective ensemble is exposed to heated air or gases at a fire scene, you can be burned. You may not be able to see these heated gases. The likelihood of being burned by convective heat transfer increases as the air temperatures increase and with longer times of exposure.

The information above concerning conductive and radiant heat burns applies to convective burns as well. You should take into account all of the information pertaining to conductive and radiant heat burns when considering the possible effects of convective heat.

No Such Thing as a “Routine” or “Ordinary” Fire

You can be seriously burned underneath your protective ensemble even though fire scene conditions may not appear to be extreme. You do not have to be near or in contact with flame, hot debris or hot surfaces to be burned. You can be burned underneath your protective ensemble in several ways. There are many variable factors at every fire scene that may interact to cause such burns. Some of these variables are the type of heat (radiant, convective and conductive) to which you are exposed, the amount of heat, your distance from the heat source, the length of time you are exposed to the heat, and the cleanliness and condition of your protective ensemble element. These and many other variables are constantly changing at a fire scene and can combine to burn you at any given moment.

Because there are so many variables that are constantly changing, it is impractical to calculate when or if your skin will reach the temperature on the “burn curve” underneath your protective ensemble sufficient to burn you at any particular time or location at any fire scene. Because conditions at a fire are constantly changing, there is no such thing as a “routine” or “ordinary” fire. Every fire scene is unique and the threat that it presents is constantly changing around you. Do not assume that because you have not been burned before at similar fire scenes that you cannot be burned under what appears to be similar circumstances. Any of the variables can combine with other variables in completely unexpected ways to seriously burn you.

Wetness

Getting your protective ensemble wet can, under certain circumstances, increase your risk of burns. Under other circumstances, getting your protective ensemble elements wet can decrease your risk of burns. For example, suppose your protective ensemble gets wet from hose water or your own sweat. Up to a point, the water in the protective ensemble will absorb heat and increase your level of protection from bums. However, if the water absorbs enough heat, it may—as hot water—transmit heat through your protective ensemble by conduction to burn you. How quickly this may happen is a function of the length of exposure, amount of heat transferred, amount of water in the protective ensemble, which layers of the protective ensemble are wet, which layers are dry, the materials used in the protective ensemble, the cleanliness and condition of the

protective ensemble, and other factors. Depending on the exposure conditions, you may not feel the heat buildup in and pass through your protective ensemble before you are burned.

Make sure your protective ensemble is thoroughly dry before use.

Feeling Heat under Protective Elements

DANGER

Your protective ensemble and other equipment will lower your ability to feel heat. Do not be misled by the absence of heat or discomfort underneath your protective ensemble or other equipment. Even though you do not feel heat or discomfort, you can be severely burned or injured suddenly and without warning. Be constantly alert to the possibility of exposure to heat and other hazards.

Your protective ensemble lowers your ability to feel heat. You may not feel heat underneath your protective ensemble before suffering a burn. Do not assume that because you are not feeling heat or discomfort through your protective ensemble that you cannot be burned. You must remain constantly alert to the fact that you are operating in an ultra-hazardous, heated environment. While wearing SCBA, ear covers, a protective hood or other gear, you will be even less able to feel heat on most parts of your body. Be constantly alert to the possibility of exposure to heat. You must use extreme caution at all times to limit your exposure to heat.

Before the use of protective ensemble elements, SCBA and other modern safety equipment, firefighters were unable to stay too long or go too deep into a fire scene without great discomfort caused by heat and smoke. Protective ensembles, SCBA, and other modern equipment have increased firefighters' level of protection. At the same time, these products have reduced firefighters' ability to feel heat and to be aware of their surroundings. Just because your comfort level has increased, do not assume that you are not at risk. Pay close attention to your surroundings and fire scene conditions. Unless you remain constantly alert, you may get too close to the heat or stay exposed to it for too long. You must use extreme caution at all times and limit your exposure to heat.

DANGER

If you feel heat or some slight discomfort or unusual sensation under your protective ensemble, you may have already been burned or are about to be burned. Immediately remove yourself from the hazardous situation and check for injury. Be constantly alert to the possibility of exposure to heat and other hazards.

If you do feel heat under any part of your protective ensemble, you may still have time to escape injury. The amount of time between feeling pain and actually suffering a burn is called "alarm time." If at any time you feel heat or even minor discomfort or unusual sensation (especially underneath your protective ensemble or other equipment)—sometimes referred to as "bee sting"-like pain—burn injury may be imminent. You should remove yourself as soon as safely possible from the heated environment. If you cannot safely leave, change your body position (e.g., get off a hot surface, back up or turn away from the heat source, etc.) or cool your environment.

No Such Person as an “Ordinary” Firefighter

Just as there is no such thing as a “routine” or “ordinary” fire, there is also no such thing as an “ordinary” firefighter. Each person reacts differently to pain, excitement, adrenaline rush, and danger. Because of this, some firefighters have less “alarm time” than others when facing a potential burn situation. These firefighters may have a very high tolerance for pain or may be less aware of their pain so that they are burned before feeling any pain. You may be burned underneath your protective ensemble with no advance warning. Also, you may encounter such a tremendous temperature that you may be burned before feeling any pain and with no advance warning. You must remain constantly alert to your changing environment and not exceed the limitations of yourself or your equipment.

Molten Substances and Hot Liquids

You may encounter molten metals and other substances as well as hot liquids at the emergency scene. Your protective ensemble may not prevent the effects of or penetration of these hazardous substances under all circumstances. Molten substances may adhere to portions of your protective ensemble and while staying in place transfer high levels of heat energy through your protective ensemble causing an increased risk for burn injury. Similarly, you may come into contact with hot liquids, such as heated water from accumulated hose spray at a firefighting operation. Your garment is particularly likely to contact hot water in low-lying layers of the structure that you step into while in the fire structure. These liquids may be at temperatures that can burn on contact with little or no warning. You must avoid contact with molten substances and hot liquids during firefighting and emergency operations to reduce your risk of death, injuries and burns.

Extreme Cold Temperatures

Even though your protective ensemble is designed to limit your risk to high-temperature, thermal exposures, it does not protect you from all exposures to cold temperatures in the environment or from cryogenic or liquefied chemicals. 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 ensemble. As with heat exposures, longer exposures at cold temperatures increase the risk of health effects, such as hypothermia and frostbite.

Chemical, Biological and Radiological Hazards

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, 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 as a result of exposure to these hazards. As a 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 elements 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 the form in which the exposure occurs. The effects of some hazardous exposures may be immediate and show up during or shortly after the exposure occurs. Effects from other hazards 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, are designed to protect firefighters and emergency responders from inhalation or ingestion of chemicals, protective clothing is designed to limit or prevent contact of chemicals with the skin. 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.

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 ensemble elements have been tested for liquid penetration resistance and material penetration resistance to viruses, this does not mean that it will protect you under all circumstances from bloodborne pathogens.

Even when wearing protective garments certified to NFPA 1970 (1971), 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. Your protective ensemble elements may limit some exposure to some biological hazards, but do not protect against all biological hazards under all conditions.

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 ensemble does not provide protection from radiological hazards. Therefore, you must avoid contact will all radiological hazards to reduce your risk of death, injuries, diseases, and illnesses associated with radiological exposure.

Even the best protective ensemble cannot protect you completely from chemical, radiological and biological hazards. Protective ensemble elements can reduce—but not eliminate—your risk of death, diseases and illnesses due to these hazards.

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 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 are part of your protective ensemble 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.

DANGER

Your protective ensemble does 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 firefighting and 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.

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 ensemble, 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 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 ensemble 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 elements may increase your risk of death, burns and injuries due to electrical shock.

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.

Hazards Caused by the Wearing or Use of PPE

The wearing of your protective ensemble 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 ensemble by your fire department or employer.

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 personal protective equipment
- Allergic reactions when contacting certain materials

Heat Stress

DANGER

Wearing your protective ensemble, elements, 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.

Heat stress is one of the leading causes of firefighter 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, and hoods or shrouds) may increase your level of heat stress. Performing strenuous tasks in the heated environment of a fire scene or in warm and/or humid weather may also increase your heat stress.

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 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, 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.

Loss of Mobility or Function

Wearing of your protective ensemble, 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.

DANGER

Wearing your protective ensemble, elements, 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 ensemble elements can potentially impair your mobility and function.

Wet, Soiled, Contaminated, and Damaged Protective Elements

Wet, dirty and/or contaminated protective elements can be a breeding ground for germs, bacteria, fungus, and other microorganisms that can cause disease and illness. Your protective ensemble elements 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 element becomes even slightly dirty or contaminated, do not use it. Dirt or contaminants reduce your protective element'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 element in strict compliance with NFPA 1850 (1851), 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 element, as their use may reduce the strength of or degrade your protective element. If you are unsure whether or not your protective element is free of contaminants or dirt, do not use it. Do not use elements that are not thoroughly clean and dry.

DANGER

Do not use your protective ensemble element 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 ensemble before use.

If your protective ensemble element becomes even slightly torn, worn, cracked, or abraded, or has holes, missing stitches, soft spots or other signs of degradation, do not use it. Tears and worn or abraded spots greatly decrease your protective ensemble's protective qualities and increase your risk of death, burns, injuries, diseases, and illnesses. 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). You and your department or employer should regularly inspect your protective ensemble for signs of wear and tear and to ensure that the protective element has not been modified or altered in any way. Even the most harmless looking changes to the protective element may increase your risk of death, burns, injuries, diseases, and illnesses.

DANGER

Do not use your protective ensemble element 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.

Skin Allergies

The wearing of your protective ensemble may produce skin allergies if you are allergic to specific substances used in the materials of protective ensemble elements 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 ensemble, especially under hot and sweaty conditions, may cause changes in your skin health and make your skin more susceptible to effects by fireground contaminants. Further, the accumulation of different contaminants in your protective ensemble elements 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.

Hazards Based on Your Position and Operating Area

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 ensemble element may be caught in operating machinery.

Ensuring Proper Fit

DANGER

Your protective ensemble must fit properly and interface with your other safety equipment so that the protective layers overlap in all body positions as required by NFPA 1550. There should also not be any gaps in your protective ensemble at any interface areas between different elements. Any gaps or tightness in your protective layers may result in death, burns, injuries, diseases, or illnesses.

Sizing, Fit and Adjustment

Before each use of your protective ensemble, make sure that it is sized and adjusted to fit properly. Your protective ensemble is made to fit you so that it is not restrictive against your body and does not unduly restrict your movement (see "Loss of Mobility or Function" above). Your protective elements should fit together with your other equipment so that the protective ensemble's 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 ensemble'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.

DANGER

Your protective ensemble is designed to be used as a unit. All elements, layers and accessories must be used and be properly in place and adjusted when being used. Failure to do so may result in death, burns, injuries, diseases, or illnesses.

Requirement for Overlap

NFPA 1550, Standard on Fire Department Occupational Safety and Health Program, requires firefighters to wear protective equipment such as helmet, hood, gloves, upper and lower torso clothing, and footwear, sized to the individual user, properly overlapped so that no gaps occur during use, and meeting relevant NFPA performance standards (i.e., NFPA 1970 [1971]).

- According to NFPA 1550, 2024 edition:
- The protective coat and the protective trousers shall have at least a 2-inch (50 mm) overlap of all layers so there is no gaping of the total thermal protection when the protective garments are worn.

- The minimum overlap shall be determined by measuring the garments on the wearer, without SCBA, in both of the following positions:
  1. Position A—standing, hands together and reaching as high over-head as possible.
  2. Position B—standing, hands together reaching overhead, with body bent forward at a 90 degree angle, to the side (either left or right), and to the back.

Consult your fire department or employer for information concerning these and other applicable standards and become familiar with their requirements. You must wear and properly use such equipment to minimize your risk of death, burns, injuries, diseases, and illnesses. Only use protective elements that fit properly. Never borrow or loan protective elements unless they properly fit you or the intended individual wearer.

Components and Layers

Your protective ensemble may also have additional layers, patches, inserts, or protective components at various points, such as the toes, ears, elbows, knees, shoulders, etc., that your manufacturer provides. You must use your protective elements as a unit. Never use your protective ensemble without all layers and components provided by the manufacturer being properly in place. Use all components or layers of the protective ensemble elements (outer shell, moisture barrier, thermal barrier, reinforcements, inserts, etc.) together. Failure to do so may result in death, burns, injuries, diseases, and illnesses.

Closures

You must fasten all closures (flaps, buttons, hooks, zippers, collars, etc.) on your protective ensemble 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. For example, an open collar may permit hot debris to get under your protective ensemble 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.

DANGER

Use the Drag Rescue Device only for rescuing a downed fire fighter by dragging. Do not use the Drag Rescue Device for any other rescue, including but not limited to vertical rescue operations, where the victim fire fighter is raised or lowered. Doing so may result in death or injury.

Drag Rescue Device (DRD)

All protective coats manufactured to the 2007 Edition of NFPA 1971 or later are required to have a drag rescue device, or DRD. The DRD is intended to assist in pulling or dragging an incapacitated fire fighter to safety. The DRD is built into your coat and designed to be readily accessed and deployed to permit rescue of downed fire fighters. The design and method of DRD deployment varies with each manufacturer. The DRD may not be deployable or usable under all circumstances when a fire fighter must be moved. The DRD is not a safety harness. It is not intended for vertical rescue operations where the downed fire fighter would be raised or lowered. For proper installation, use, care, and maintenance of your protective coat DRD, refer the specific instructions provided by the manufacturer.

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 ensemble elements for use by its 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 ensemble in fighting a particular fire or emergency response
- Whether to enter a particular burning building
- Whether to remain in a particular burning building
- What parts of the building should or should not be entered

Because the manufacturer of your protective ensemble element 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, and 29 CFR 1910.132.

NFPA Label

The NFPA label on your protective ensemble element states that your protective element is a structural (or proximity) firefighting protective element, such as protective garments, and is compliant with the NFPA 1970 (1971), 2025 Edition standard. This does not mean that you cannot be seriously injured as long as you use the protective ensemble only for structural firefighting (or proximity firefighting). Even if you limit yourself to structural (or proximity) firefighting, you are still at risk of death, burns, injuries, diseases, and illnesses as described on the element's label and in this guide. As previously explained, there is no such thing as a "routine" or "ordinary" structural (or proximity) fire, and you must realize that you are at risk at all times during firefighting operations.

DANGER

Your structural or proximity ensemble will not protect you for entry firefighting applications. Use of structural or proximity ensembles for entry firefighting applications may lead to death, burns, injuries, diseases, and illnesses.

Your structural or proximity protective ensemble alone may not provide protection for fire entry applications or for protection from chemical, radiological or biological agents. You must not use your structural protective ensemble for proximity or entry firefighting applications. If you use your structural protective ensemble for proximity or entry firefighting applications, you will be at great risk of death, burns, injuries, diseases, and illnesses.

You must not use your proximity ensemble for entry firefighting applications. If you use your proximity protective ensemble for entry firefighting applications, you will be at great risk of death, burns, injuries, diseases, and illnesses.

Similarly, your protective ensemble does not protect you from all of the diseases and illnesses caused by poisons, toxins, carcinogens, radioactivity, germs, infectious bodily fluids, bloodborne pathogens, and similar chemical, radiological and biological hazards routinely found at fire scenes or during extraordinary events where chemical, biological, radiological, or nuclear (CBRN) terrorism agents have been accidentally or intentionally released.

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

- The name of the manufacturer and their address, including their country
- An element 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 element name, number, or design
- The size or size range of the element
- Identifications for the principal materials of construction
- Cleaning precautions or a notification or QR code for accessing these precautions

- A statement indicating compliance with the 2025 Edition of NFPA 1970 (1971) or earlier edition of the NFPA 1971 standard, depending on its date of manufacture. All protective garments manufactured after March 2026 are required to meet the 2025 edition. The mark (logo) of the certification organization should be present on the label of any certified garment.
- If represented as not having PFAS in the principal material, a separate statement with this information will be provided. If the statement is not present, then you should not assume that the garments do not have intentionally added PFAS.
- 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 inner service of the liner. Outer shells of protective garments also have some of the above information for identifying the materials and traceability information for the garment.

Some protective elements may include additional certification statements when the protective element is also certified to one or more additional NFPA or other standards. This guide applies to the use of protective garments that are certified to NFPA 1970 (1971), 2025 Edition.

Donning and Doffing

WARNING

How you don and doff your protective garments affects your life and safety. You must wear the protective ensemble 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 ensemble to avoid contaminating yourself and others with hazardous substances.

Do not wear your garments if it has not been cleaned or is 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 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. Before donning your protective coat, ensure that your Drag Rescue Device (DRD) is properly installed and stored for future deployment.
2. 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.
3. Place your coat collar in the fully extended, “up” position.
4. Secure collar closure completely covering the collar opening. Be sure there are no gaps in coverage.
5. 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.
6. Ensure that all layers of your protective coat overlap all layers of your protective trousers by at least 2 inches in all body positions. (See NFPA 1550, 2024 edition.)
7. Ensure proper fit, with no tightness or gapping.

You may measure for adequate overlap by assuming the following body positions without wearing SCBA:

Position A — standing, hands together reaching overhead as high as possible.

Position B — standing, hands together reaching overhead and bending body at waist to the front, the sides and to the back as much as possible.

With both your coat and your trousers, consider going through a range of expected fireground motions and body orientations to assess the adequacy of your donning process to make sure that everything is properly in place and secure.

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. Firefighting 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 that 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 footwear contaminated with biologically hazardous materials. See current version of NFPA 1891 for similar information concerning chemical hazards.)

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.

- Avoid spreading the contaminants from your protective garments to your personal belongings, your living quarters and/or interior spaces in buildings and vehicles.
- 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 ensemble being contaminated (e.g., gloves).
- Place contaminated protective garments in a sealable, leak-proof, airtight bag.
- 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 element 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 elements without the manufacturer's written authorization. This includes placing emblem or patches on the exterior of the 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 protective garments regularly in accordance with NFPA 1850 (1851), 2026 Edition.

Universal PPE Handling Precautions

NFPA 1850 (1851) requires that universal precautions be observed when handling ensemble elements. This means that you should always assume the protective element 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 ensemble elements, you should wear:

- An apron with sleeves or coverall that meets the multi-functional garment requirements of NFPA 1950.
- An N95 or higher filtering facepiece respirator approved by NIOSH.
- A faceshield is also recommended.

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

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.

Types of Inspections

NFPA 1850 (1851) establishes requirements for both routine inspections and advanced inspections:

- Individual users routinely 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 should conduct advanced inspections at a minimum of once every 12 months or whenever routine inspections indicate that a problem could exist.
- Even if your garments have not been worn for a period of 3 years, your garments must be subject to an advanced inspection after that amount of time.

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.

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. Your protective garments should be inspected for:

- Proper fit
- 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
- Correct assembly and size compatibility of shell, liner and the Drag Rescue Device (DRD)

In examining your protective garments, you should 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. It is essential that your Drag Rescue Device (DRD) be properly installed and free from damage.

You should inspect the DRD components that are included with protective garments for the following:

- Proper installation in garment
- Soiling
- Contamination
- Physical damage such as, but not limited to, cuts, tears, punctures, abrading, cracking, or splitting
- Thermal damage such as, but not limited to, charring, burn holes, melting, or discoloration
- Loss of seam integrity and broken or missing stitches

You should also inspect interface components, such as wristlets and other devices that permit integration of other ensemble elements with your garment, for the following:

- Soiling
- Contamination
- Physical damage
- Loss or reduction of properties that allow a component to continue as an effective interface, such as, but not limited to, loss of shape or loss of ability to remain attached to the respective element(s) where attachment is required
- Loss of seam integrity and broken or missing stitches

In addition to the items above, you should inspect proximity fire fighting protective garment outer shells for loss of reflectivity, loss of reflective coatings, and delamination as evidenced by separation or peeling of the outer shell. This type of damage generally first manifests as small cracks that follow by flaking of the outer reflective coating. Such damage often occurs in areas where the garment is repeatedly flexed.

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 or verified independent service provider (ISP) for evaluation.

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

If an inspection discloses any damage or deterioration to any protective element, 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 element.

Advanced Inspections

Advanced inspections are the responsibility of your fire department or organization. Only trained individuals from your fire department that include the PPC manager, a PPC technician, or other individuals trained by your organization or 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 1850 (1851), 2026 Edition. Within a fire department or organization, it is the role of the PPC manager to perform, manage, or coordinate advanced inspections of the department PPE.

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:

- Loss of moisture barrier integrity that includes rips, tears, cuts, or abrasions
- Evaluation of system 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
- Loss of wristlet elasticity, stretching, runs, cuts, or burn holes
- Reflective trim integrity, attachment to garment, reflectivity, or damage
- Label integrity and legibility
- Functionality and integrity of garment hardware, closures, liner attachment, and accessories.

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 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.

Inspection of Moisture Barriers

While all materials and components in garment elements are susceptible to different types of damage from wear or abuse, the moisture barrier, with its film or coating side of most moisture barriers facing the interior of the liner, is one of the most difficult parts of the garment element to inspect and evaluate. Even when a garment element is equipped with a means of opening the liner to view the film or coating side, it is difficult to conduct a visual evaluation of the moisture barrier film or coating. Even a physical examination of the moisture barrier film or coating side may not detect all types of damage or defects that can lead to liquid penetration resistance for the garment element.

Frequently examine moisture barrier at high wear areas, including but not limited to elbows, under the arms, seat areas, and knees (as well as some parts of the liner positioned next to the drag rescue device [DRD]), to ensure there has been no abrasion or deterioration in the liquid resistant coating of the barrier layer. In the event of either questionable appearance or characteristics, return the garment to the manufacturer for expert analysis to determine whether the garment's protective qualities have been altered. Never make moisture barrier repairs in the field.

NFPA 1850 (1851), 2026 Edition requires the conduct of a complete liner inspection as part of the annual advanced inspection and whenever a routine inspection determines potential damage to the liner. As with the advanced inspection procedures, the fire department or organization PPC Manager is responsible for its coordination. The complete liner inspection contains specific test procedures for the evaluation of moisture barrier integrity in your protective garments. Only trained personnel meeting the requirements of NFPA 1850/1851 standard can perform these test procedures.

The procedures entail removing the liner from the protective coat and trousers and testing selected non-seam and seam areas of the liner's moisture barrier for water penetration using a special hydrostatic testing apparatus. The apparatus applies water to the normal external side of the moisture barrier layer for a short time and set pressure where the test operator looks for signs of water penetration through the film side of the moisture barrier. Tested areas of the garment moisture barrier are marked with the test date and with an indication of the test results. Tested areas showing leakage are subject to repairs (see Chapter 6). Based on the results, the testing may be extended to other areas of the liner moisture barrier.

WARNING

The moisture barrier in your protective ensemble has not been evaluated for all chemicals that can be encountered during firefighting operations the effects of chemical exposure on the moisture barrier are to be evaluated by the user for the inspection procedures in the current edition of NFPA 1850/1851.

Limitations of Inspection

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

Record Keeping

NFPA 1850 (1851), 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

Chapter 5

Cleaning and Decontamination

General Cleaning Requirements and Warnings

DANGER

You must keep your protective garments clean and free of contamination. If you do not keep your protective garments clean, you increase your risk of death, burns, injuries, diseases, and illnesses.

It is important to keep protective garments clean and contamination free. Soiled or contaminated protective garments are a hazard to fire fighters 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 service and manufacturers have been working very hard to get the message across that contaminated and soiled protective clothing and equipment put firefighters 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 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.

This is not merely a question of style, neat appearance and comfort, it is a matter of life and death.

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 ensembles and ensemble elements will assist in removing these substances. Ensembles and ensemble elements can also become contaminated with other substances, principally hazardous materials, particulates, and body fluids or other potentially infectious materials. In order to clean structural and proximity firefighting clothing and equipment, preliminary exposure reduction, advanced cleaning, decontamination, sanitization and specialized cleaning of ensembles and ensemble elements might all be needed. Different procedures must be followed for each of these cleaning and decontamination processes to be fully effective.

Health Risks of Soiled or Contaminated Protective Garment

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.

Soiled or contaminated protective garments can expose fire fighters 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 on the fire ground, 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 a 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.

Reduced Performance Hazards of Contaminated Protective Clothing

When protective garments become laden with particles, contaminants and chemicals, other problems besides exposure to these contaminants are introduced that include, but not limited to, the following:

- Soiled protective garments typically reflects 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 firefighters can still encounter various chemicals in their normal firefighting activities, even if they are not 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 the firefighter's knowledge.
- These contaminants, in addition to being hazardous, can also degrade ensembles and ensemble elements 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 repelling treatments (if present) can be removed.
  - ☑ Visibility markings can become less visible and/or lose their fluorescent and retroreflective properties.
  - ☑ Ensemble and ensemble element hardware can become corroded.

Any exposure of protective ensembles and elements to CBRN terrorism agents warrants immediate disposal of the protective clothing and equipment in accordance with all applicable Federal, state and local regulations. Protective garments that have been exposed to CBRN terrorism agents should not be inspected, cleaned or repaired.

Other General Warnings

WARNING

Soiled or contaminated protective 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 ensemble elements home or into living quarters in your firehouse.

Do not wear or have soiled or contaminated garments inside in the living quarters of the fire 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 clothing, including protective firefighting garments.

Do not transport soiled or contaminated garments in the passenger area of an apparatus 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 the protective garment manufacturer prior to dry cleaning to learn whether or not a specific dry cleaning process will damage your protective garments.

Types of Cleaning

NFPA 1850 (1851), 2026 Edition defines several different types of cleaning:

- **Preliminary Exposure Reduction** is done on the fire scene and provides techniques for reducing soiling and contamination levels on the exterior of the ensemble or ensemble elements following incident operations.
- **Cleaning.** The act of removing soils and contamination from ensembles and ensemble elements by mechanical, chemical, thermal, or combined processes.
- **Advanced Cleaning.** The act of removing both soiling and contamination generally associated with products of combustion. Advanced cleaning requires protective elements including garment to be temporarily taken out of service.
- **Specialized Cleaning.** The act of removing hazardous materials, soiling associated with body fluids, or other forms of contamination.
- **Cleaning Facility.** An entity, location, or site engaged in the cleaning of ensemble elements that includes an element manufacturer verified in cleaning, a verified cleaner, a verified organization or a verified ISP.
- **Contract Cleaning** is cleaning conducted by a facility outside the fire department or organization that specializes in cleaning protective clothing.
- **Decontamination.** The act of removing contamination from or neutralizing contamination in protective clothing and equipment.
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- **Disinfectant.** A type of antimicrobial agent that destroys or irreversibly inactivates fungi and bacteria, but not necessarily their spores, on inanimate surfaces and objects.
- **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.

Preliminary Exposure Reduction

In the 2020 revision of NFPA 1851, the term routine cleaning was replaced with preliminary exposure reduction to provide a means for reducing your exposure to exterior contamination on your protective clothing and equipment. You are responsible for the preliminary exposure reduction of your protective ensemble, including your protective garment immediately after exiting the emergency scene at an incident where elements could have become soiled or contaminated. As part of this process, you should examine the manufacturer's label, consult these instructions and refer to NFPA 1850 (1851), 2026 Edition for additional information to carry out the preliminary exposure reduction of your protective ensemble.

Performing preliminary exposure reduction immediately after the termination of an incident can remove substantial amounts of surface contaminants before they have a chance to "set in." This can also help to limit the transfer of contaminants to apparatus and stations. Preliminary exposure reduction of your protective ensemble as soon as possible after exposure to harmful contaminants can assist in the removal of those contaminants.

You, your fire department, or employer should evaluate the contamination levels of your protective ensemble and initiate appropriate preliminary exposure reduction at the emergency scene, while remaining on air from your self-contained breathing apparatus.

Dry and Wet Mitigation

Techniques for both wet and dry mitigation are provided in this document, to be performed prior to removal of any protective ensemble elements. As part of the preliminary exposure reduction, adhere to the following steps, using dry mitigation, wet mitigation, or both techniques:

Dry Mitigation

1. Perform dry mitigation by brushing debris from the exterior with a soft brush prior to removing the ensemble elements.
2. Brush beginning at the top of the ensemble and work your way down towards the footwear, brushing any soils to the ground.
3. Do not use a leaf blower or fan as this will simply disperse to soils into the air and increase the likelihood of exposing personnel to inhalation of these contaminated particles.
4. While dry mitigation helps remove solid or particulates from the exterior of the protective ensemble, it is not as effective as wet mitigation.

Wet Mitigation

1. Perform wet mitigation by gently rinsing the exterior of the ensemble elements using low-pressure and low-volume flow water prior to removing the ensemble elements.
2. Ideally, use a mild detergent in a bucket of water with a moderate stiffness bristle brush to scrub the ensemble starting at the helmet and work down the sides of the firefighter.
3. Follow up with a gentle rinsing.
4. Do not use heavy scrubbing or spray with high velocity water jets such as a power washer as these actions may simply transfer exterior contamination to interior layers of the clothing.
5. If both wet and dry mitigation techniques are being used, perform dry mitigation prior to wet mitigation.
6. Following mitigation, isolate and bag the protective clothing and equipment
7. Ensure that the protective clothing and equipment are subjected to appropriate advanced or specialized cleaning procedures as necessary.

Advanced Cleaning

Submit your protective garments for advanced cleaning at least once every six months, resulting in a minimum of two advanced cleanings in a 12-month period. One of the advanced cleanings should occur at the time of annual inspection. NFPA 1850 (1851), 2026 Edition includes the words "elements that are issued and used shall receive the advanced cleaning every six months", clarifying that elements that have not been used are not required to follow this minimum cleaning schedule. Once again, following this schedule will result in a minimum of two cleanings in a 12-month period for used and issued elements.

NFPA 1950 (1851), 2026 Edition requires advanced cleaning to be performed by an element manufacturer verified in cleaning, a verified cleaner, a manufacturer trained organization for its own clothing, a verified organization, or a verified ISP. Verification must be in accordance with NFPA 1850 (1851), 2026 Edition. The original manufacturer of the protective garment, a verified ISP, or a verified organization will determine the level of training for individuals in the fire department or organization necessary for conducting advanced cleaning.

Advanced cleaning should involve the following:

- Soiled or contaminated protective garments must receive advanced cleaning prior to reuse.
- Subject elements that have been exposed to blood or other body fluids to sanitization or disinfection prior to advanced cleaning.
- Advanced cleaning is permitted prior to sanitization or disinfection if the procedures for advanced cleaning have proven effective for sanitization or disinfection.
- Protective garments that have been exposed to bulk chemicals, unusual biological contaminants, or other substances of a highly hazardous or unusual nature should be subjected to specialized cleaning in lieu of advanced cleaning.
- Examine the manufacturer's label of your protective garment to determine if there are any unique instructions on cleaning and drying that the manufacturer has provided with this element. In the absence of unique manufacturer's instructions or manufacturer's approval of alternative procedures for the protective garment, use the advanced cleaning and drying procedures, as well as the instructions for sanitization, disinfection, and specialized cleaning provided in this section.

NFPA 1850 (1851), 2026 Edition indicates prescribed that protective garments be subject to advanced cleaning using a washer/extractor with an appropriate formulation (series of washing, rinsing, and extraction steps and conditions). The standard specifies that a top loading machine or utility sink (for hand washing) not to be used. Alternative machine-based cleaning is permitted as long as the procedures used can be verified for their effectiveness and that there are no known adverse impacts on the protective garments as the result of repeated use of the process. Specific acceptable procedures are provided below.

Washer/Extractor Machine Cleaning

Advanced cleaning of protective garments must be performed by using a washer/extractor that is programmable, which permits multiple formulations for adjustment of detergent application, water temperature, water level, cycle type/function, and cycle time. Do not use top loading machines, with or without a center post agitator.

Conduct advanced cleaning of protective garments using the following procedures:

1. Apply universal precautions in the washing of all soiled or contaminated clothing.
2. If the protective coat has a Drag Rescue Device (DRD) and the DRD is removable, remove the DRD prior to the coat being laundered.
3. If the DRD also requires cleaning, in the absence of specific instructions from the manufacturer, place it in a separate mesh bag for washing and drying. Unless prohibited by the manufacturer, the DRD in mesh bags can be laundered with garment outer shells.
4. If the garment includes removable fall protection, remove the fall protection items and launder separately following manufacturer's instructions.
5. Where the outer shells and liners of protective garments are separable, clean outer shells with outer shells and liners with liners.
6. For liners that can be separated, ensure that the film side of the moisture barrier is on the inside of the liner for both machine washing and machine drying.
7. Do not overload or underload the machine.
8. Pre-treat heavily soiled or spotted areas.
9. DO NOT USE chlorine bleach, chlorinated solvents, active ingredient cleaning agents, or solvents without manufacturer's approval.
10. Fasten all closures, including pocket closures, hook and loop closure tape, snaps, zippers, and hooks.
11. Do not exceed a water temperature of I20°F (49°C).
12. 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.
13. Do not use a machine that exceeds an acceleration of 100 Gs (980 m/s2).
14. 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.
15. Inspect and rewash the protective garment if necessary.
16. 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.
17. Dry the protective garment as described under Drying Procedures below.

The wastewater from the washing machine must be handled and disposed of in accordance with Federal, State and local laws.

DO NOT clean outer shells and other radiant reflective components of proximity fire fighting protective ensembles and ensemble elements with a brush or any other abrasive cleaning devices.

Unless specifically permitted by the manufacturer, do not machine wash or machine dry outer shell and other radiant reflective components of proximity fire fighting protective garments.

Proximity radiant reflective outer shells must be cleaned with a soft cloth or sponge.

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 1850 (1851), 2026 Edition does provide some guidance for when machine drying is to be used.

Air drying or a drying cabinet are the most appropriate methods for drying protective garmentss. 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.

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 (49oC).

Use of Drying Cabinet

1. Place elements in drying cabinet to allow good air circulation between each element.
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 (49oC).

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.

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.8.4.1) of NFPA 1850 (1851), 2026 revision.

Sanitization, Disinfection, and Specialized Cleaning

NFPA 1850 (1851), 2025 Edition provides two decision trees:

1. Approach for Deciding the Handling, Cleaning, and Disposition of Ensemble Elements.
2. Approach for Addressing Specific Types of Contamination.

The second decision tree supplies an approach for addressing the specific types of contamination and includes actions for elements that have been contaminated with:

- Bulk chemicals.
- Asbestos and other designated hazardous substances.
- Body fluids and other microbial contamination.
- Fires where Lithium-ion batteries that include mobile or station energy storage systems.
- Products of combustion.

Members of the fire department are highly encouraged to review this portion of the NFPA 1850 (1851), especially the aforementioned decision trees and the related narrative and annex guidance information.

Specific guidance as to the decision of whether advanced cleaning, sanitization or disinfection, or specialized cleaning is provided in second decision tree with the following general recommendations.

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.

Bulk Chemicals

- For protective garments that are known or suspected to have been exposed to bulk chemicals, undertake preliminary exposure reduction and then isolate, tag, and bag the items at the scene.
- Have the type of bulk chemical assessed by a hazmat team or other qualified expert to determine if cleaning or decontamination is possible.
- When contaminant has been identified, consult with the manufacturer or supplier of the contaminant to determine an appropriate decontamination agent and process.
- If cleaning or decontamination are not possible, condemn and retire the protective garment and dispose of it as hazardous waste in accordance with federal, state, and local regulations.
- If cleaning or decontamination is possible, have the affected protective garment(s) undergo specialized cleaning.

Asbestos and other Designated Hazardous Substances

- For protective garments that are known or suspected of having been exposed to asbestos or other designated hazardous substances, undertake preliminary exposure reduction and then isolate, tag, and bag the items at the scene.
- Have the organizations hazmat team or other qualified expert determine if cleaning or decontamination is possible.
- If cleaning or decontamination are not possible, condemn and retire the protective garment(s) and dispose of them as hazardous waste in accordance with federal, state, and local regulations.
- If cleaning or decontamination is possible, have the affected protective garment(s) undergo specialized cleaning.

Body Fluid and other Microbial Contaminations

- For protective garments that are known or suspected of having been exposed to body fluid or other microbial contaminants undertake preliminary exposure reduction and then isolate, tag, and bag them at the scene.
- Have protective clothing items evaluated by qualified individuals or experts to determine if disinfection or sanitization and cleaning is possible.
- If disinfection or sanitization and cleaning is not possible, the condemn and retire protective garment(s) and dispose of them as hazardous waste in accordance with federal, state, and local regulations.
- If disinfection or sanitization and cleaning is possible, have the affected protective garment(s) undergo disinfection or sanitization procedures, followed by advanced cleaning.

Lithium-Ion Battery and Related Device Contamination

- For protective garments that are known or suspected to have been exposed to decomposition products of lithium-ion battery and related device fires, undertake preliminary exposure reduction and then isolate, tag, and bag the items at the scene.
- Following preliminary exposure reduction, determine if advanced cleaning or specialized cleaning should be applied on the basis of the following factors:
  - ☑ The total proportion of the fire contents involving lithium-ion batteries or related products.
  - ☑ The degree to which firefighters were exposed.
  - ☑ The environmental conditions of the fire scene.
  - ☑ The availability of any exposure data at the fire scene.
  - ☑ Prior experience cleaning protective elements at similar fires.
  - ☑ The availability of documentation for cleaning to remove this contamination.
  - ☑ The ability to test pre- and post-wash gear for cleaning effectiveness.
- If advanced or specialized cleaning is not judged as not possible, condemn and retire the protective garment(s) and dispose of as hazardous waste in accordance with federal, state, and local regulations.
- If advanced or specialized cleaning is possible, have the affected protective garment(s) should undergo advanced or specialized cleaning as appropriate.

Products of Combustion Cleaning

- Protective garments that have been exposed to products of combustion should undergo preliminary exposure reduction and then isolated, tagged, and bagged at the scene.
- Following preliminary exposure reduction, the protective garment(s) should undergo advanced cleaning.

Disinfection or Sanitization

While NFPA 1850/1851 refers to both disinfection and sanitization, the minimum requirements for protective garments for structural and proximity fire fighting is sanitization. This is because of the multiple porous textile and other types of materials used in the construction of protective garments.

Disinfection for products of this type at levels that result in a million-fold reduction of potentially infectious microorganisms is difficult to achieve. On the other hand, sanitization reduces the number of most microorganisms by a factor of one thousand.

Sanitization is generally performed only to reduce microbial contamination and does not provide cleaning removal of biological soils. For this reason, sanitization is combined with advanced cleaning where sanitization precedes advanced cleaning in many cases. It also possible to undertake sanitization of protective garments in a process that combines sanitization and advanced cleaning.

Sanitization can be achieved by a variety of sanitizer chemicals, additives, or processes that include the use of a soak tank with a sanitizer or disinfectant that is registered with the EPA that is undertaken prior to separate advanced cleaning, the use of an EPA-registered laundry

sanitizer additive as part of the advanced cleaning process in a washer extractor and use of ozone injection as part of the advanced cleaning process.

Specific information on EPA-registered disinfectants and sanitizers can be obtained directly from the EPA at https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants. This website lists EPA registered sanitizers or disinfectants and is searchable by type disease, manufacturer name, product name, or EPA registration.

- Processes for disinfection, sanitization, cleaning and decontaminating protective garments that have been contaminated with body fluids or other potentially infectious materials must be performed by a manufacturer verified in cleaning, a verified cleaner, a manufacturer-trained organization, a verified organization or a verified ISP.
- Organizations that engage in disinfection or sanitization of protective garments contaminated with body fluids or other potentially infectious materials should comply with applicable regulations in 29 CFR 1910.1030, “Bloodborne Pathogens.”
- Garments that have been exposed to blood, body fluids, or other potentially infectious materials should undergo sanitization, when the organizations hazmat team or other qualified expert(s) have determined that disinfection or sanitization and cleaning is possible.
- Have advanced cleaning or specialized cleaning should be performed after sanitization, unless disinfection or sanitization is part of the advanced cleaning.
- Disinfectants and sanitizers must be registered with the EPA for efficacy for hard surfaces or fabrics and textiles, as applicable.
- Use spot disinfection or spot sanitization, followed by spot cleaning, if the area of contamination is limited and clearly visible.

Specialized Cleaning

Specialized cleaning is intended for other forms of contamination that cannot be removed by either advanced cleaning or sanitization (or disinfection). Specialized cleaning may be necessary for extreme fireground contamination, the exposure of protective garments to highly persistent forms of contamination, and certain unique forms of contamination that are considered highly hazardous such as asbestos or fentanyl (and other synthetic opioid drugs) or require unusual decontamination processes such as bed bugs. Specialized cleaning is subject to the following considerations. Processes for sanitization, cleaning and decontaminating garments that have been contaminated with blood, body fluids, or other potentially infectious materials must be performed by a manufacturer verified in cleaning, a verified cleaner, a manufacturer-trained organization, a verified organization or a verified ISP.

- Specialized cleaning should only be employed when advanced cleaning, or sanitization, or disinfection is inadequate, and must be performed by a manufacturer verified in cleaning, a manufacturer trained organization, a verified organization, a verified cleaner or a verified ISP.
- Relying upon the expertise of hazmat teams, infection control specialists, verified ISP's or other individuals knowledgeable about contaminants, the organization should designate specific substances or contaminants that require specialized cleaning, and determine the exact approach.
- Apply disinfection or sanitization with specialized cleaning for the removal of body fluids or other infectious materials that cannot be removed using disinfection or sanitization with advanced cleaning.
- Where appropriate for specialized cleaning, wash water temperature of 140°F is permitted.
- If it has been determined that contaminants cannot be removed, condemn and retire the protective clothing item(s) and dispose of in accordance with federal, state, and local regulations.
- If it has been determined that the contaminant can be removed, conduct specific procedures for cleaning or decontaminating the protective clothing items.
- It may be important to provide evidence that the selected specialized cleaning procedures is effective for the removal of the specific contaminants of concern. This evidence can come from verified entities with documentation of having successfully passed the effectiveness of cleaning required by verification, or by conducting testing of contaminated clothing that provides results showing the absence of contamination or levels of contamination that have been deemed to be safe.
- When specialized cleaning is applied, consideration the disposition of the effluent from the cleaning process and whether disposal into the local sewer system is acceptable according to federal, state, and local regulations.

Chapter 6

Repair

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 element 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.

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 advanced 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 1970/1971. 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.

All repairs must be made in accordance with NFPA 1850 (1851), 2026 Edition. NFPA 1850/1851 distinguishes between basic repairs that can be made by the original garment manufacturer, by both verified and non-verified organizations, and by both verified and nonverified ISP's. Verified cleaners are only verified to provided advanced cleaning and sanitization by a third-party certification organization and have not been verified for anything but cleaning and sanitization.

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 a liner inspection, if opened for the purpose of conducting a liner inspection.

Chapter 7

Storage

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°C (–25°F) or above 82°C (180°F). Prolonged storage of your protective garments to temperature extremes can reduce the performance properties of your protective garments.

Proximity firefighting protective coat and trouser elements must be stored by hanging to limit the damage to the aluminized outer shell that can be caused by creasing and must not be stored folded.

Storage of your protective garments by folding can cause permanent creases which can cause loss of insulation and reduction of performance properties in the area of the crease. Instead, protective garments are best stored by placing the clothing on a blunt set of hooks or a heavy-duty hanger.

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

Ensembles or ensemble elements 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.

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

WARNING

Do not wear your protective garments any longer than 10 years past the manufacture date on the garments label. Do not wear your protective garments at any time if it should be retired and replaced earlier than 10 years past the manufacture date on the garments label. Failure to retire your protective garments when needed may increase your risk of death, injuries, diseases, and illnesses.

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 elements 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

Chapter 8

Retirement and Disposal

Pursuant to OSHA regulations, your fire department or employer must determine whether or not your protective ensemble is ready for retirement and replacement. The actual service life of each protective element varies depending on the amount of use and how well it has been cleaned and maintained. NFPA 1850 (1851), 2025 Edition requires that you must retire your protective element if is older than 10 years past the date the garment was manufactured.

Your protective garments may require retirement earlier than the mandated 10 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. The responsibility for deciding when to retire and replace 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.

WARNING

Do not wear your protective garments any longer than 10 years past the manufacture date on the garments label. Do not wear your protective garments at any time if it should be retired and replaced earlier than 10 years past the manufacture date on the garments label. Failure to retire your protective garments when needed may increase your risk of death, injuries, diseases, and illnesses.

Methods to Determine Need for Retirement

According to NFPA 1850 (1851), 2026 edition, your organization or employer must develop specific criteria for the removal of firefighting protective elements, which include, but are not limited to, issues that are specific to garments that you are using, the manufacturer's instructions and your organization's experience with the respective elements.

Your protective element must be retired if:

- Your organization or employer determines that the protective element is worn or damaged to the extent that your organization or employer is unable to or it is not cost effective to provide appropriate repairs.
- The protective element was not in compliance with the 2025 edition of the NFPA 1970 (1971) or past editions of NFPA 1971 when it was manufactured.
- Your organization or employer determines that the protective element is contaminated to the extent that your organization or employer is unable to or it is not cost effective to provide appropriate decontamination.
- Your protective element has been contaminated by CBRN terrorism agents.
- Your protective element is more than 10 years old based upon manufacture date on the label.
- Your protective proximity outer shell is more than 5 years old based upon manufacture date on the label.

DANGER

Retire your protective garments immediately if it has been contaminated by chemical, biological, radiological, or nuclear (CBRN) terrorism agents after any confirmed exposure. Failure to do so will increase your risk of death, burns, injuries, diseases, and illnesses.

Acceptable Methods of Garment Disposal

DANGER

Retired protective garments are not suitable for firefighting and emergency activities. Do not use any protective garments that has been retired for any firefighting or emergency activity. Doing so increases your risk of death, burns, injuries, diseases, and illnesses.

If retired, your protective element must be destroyed or disposed of in a manner that ensures that the element 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.

If your protective element has been retired and your organization or employer determines that the garments is not contaminated, defective or damaged, the protective element may be used in training that DOES NOT INVOLVE LIVE FIRE provided that your organization or employer clearly marks on the protective element that it is for training only and not for use in live fires.

Chapter 9

Special Incident Exposures

NOTE: If you are involved in firefighting or other emergency activity where serious firefighter 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 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 ensemble, including your protective garments, 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: **1970garments**

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.

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. 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 1971, Standard on Protective Ensembles for Structural and Proximity Fire Fighting
- 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]

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

- 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 1910.156, “Fire Brigades”
- 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 product 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. (See also CBRN Terrorism Agents)

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 ensembles and ensemble elements by mechanical, chemical, thermal, or combined processes.

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

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

Cleaning Facility. An entity, location, or site engaged in the cleaning of ensemble elements that includes an element manufacturer verified in cleaning, a verified cleaner, a verified organization or a verified ISP.

Contamination. The accumulation of products of combustion and other hazardous materials on or in an ensemble element 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.

Disinfectant. A type of antimicrobial agent that destroys or irreversibly inactivates fungi and bacteria, but not necessarily their spores, on inanimate surfaces and objects.

Elements. See definition of Ensemble Elements.

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. See Structural Fire Fighting Protective Ensemble and Proximity Fire Fighting Protective Ensemble.

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

Entry Fire Fighting. Extraordinarily specialized fire fighting operations that can include the activities of rescue, fire suppression and property conservation at incidents involving fires producing extreme levels of radiant, conductive and convective heat. NOTE: Neither Structural fire fighting nor Proximity fire fighting is Entry fire fighting.

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.

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 element or component of an element 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 ensemble or element 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.

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 element manufacturer of the same element type to conduct any one or a combination of advanced cleaning, advanced inspection, and basic repair on the organization's elements.

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

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.

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

Preliminary Exposure Reduction. Techniques for reducing soiling and contamination levels on the exterior of the ensemble or ensemble elements following incident operations.

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

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

Retirement. The process of permanently removing an element 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 an ensemble or ensemble element that could degrade its performance or cause hygiene issues.

Specialized Cleaning. See definition of Cleaning.

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.

Universal Precautions. An approach to infection control in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV and other bloodborne pathogens. Under circumstances in which differentiation between body fluids is difficult or impossible, all body fluids shall be considered potentially infectious materials.

Verified Cleaner. An independent cleaning service verified by a third-party certification organization to conduct advanced cleaning and sanitization.

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 elements.

Notes

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.

FEMSA

www.femsa.org

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 (f 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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