



Understanding the **NEW**
NFPA

1850

Standard

Combining Turnout Gear and SCBA Selection,
Care and Maintenance Requirements

FIRE RESCUE 1

The proper selection, care and maintenance of personal protective equipment (PPE) intended for structural firefighting are essential for ensuring firefighter protection and safety. NFPA 1851, covering turnout gear, and NFPA 1852, covering SCBA, have now been consolidated into NFPA 1850. This new standard mainly applies to fire departments rather than solely to manufacturers as is the case for PPE product standards (e.g., NFPA 1970 on turnout gear, uniforms, SCBA and PASS).

The roots of this standard extend back to early efforts by Fire Industry Education and Resources Organization (F.I.E.R.O.) that created the first guidelines for inspecting and cleaning firefighter protective clothing at a time when routine care and maintenance were less common. The first

edition of NFPA 1851 came out in 2001, followed by NFPA 1852 in 2002. The cultural transition it reflects – from celebrating the “Marlboro Man” image of dirty firefighters to recognizing the health risks of contaminated gear – marks one of the fire service’s most significant evolutions. NFPA 1850 consolidates program responsibilities, cleaning standards, verification requirements and retirement criteria into a unified framework that enhances safety and accountability for fire department management of PPE.

Organization and content of the new standard

The new NFPA 1850 standard provides a common overall scope, definitions and references for both turnout gear and SCBA with separate chapters related to selection, care and maintenance as shown below.

Table 1 – Structure of NFPA 1850

Common Chapters	
Chapter 1	Administration (Scope, Purpose, Application)
Chapter 2	Referenced Publications
Chapter 3	Definitions
Annex A	Explanatory Material

NFPA 1851 (Turnout Clothing Portion)	NFPA 1852 (SCBA Portion)
Chapter 4	Chapter 14
Chapter 5	Chapter 15
Chapter 6	Chapter 16
Chapter 7	Chapter 17
Chapter 8	Annex B
Chapter 9	
Chapter 10	Annex C
Chapter 11	
Chapter 12	
Chapter 13	
Annex D	
Annex E	

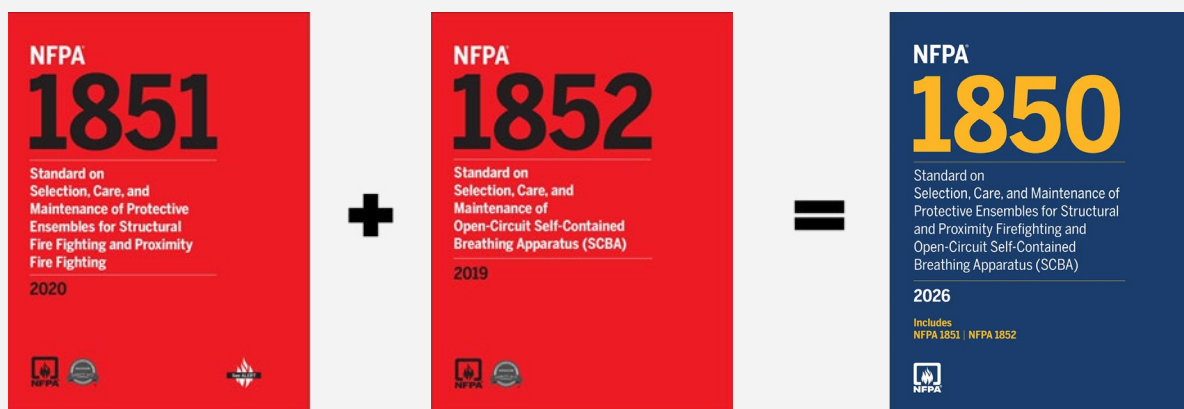


Figure 1 Consolidation of two PPE Standards into new NFPA 1850

The consolidation process was undertaken to establish commonalities in practices for all parts of the overall ensemble for structural and proximity firefighting. For example, definitions for various types of cleaning and decontamination are now consistent for both turnout clothing and SCBA.

Key changes appearing in NFPA 1850 and implementation

Relative to their predecessor editions – NFPA 1851-2020 and NFPA 1852-2021 – key changes for the consolidated NFPA 1850 include those in Table 2 below.

NFPA 1850 became effective September 9, 2025. For the parts of the standard associated with NFPA 1851 related to turnout gear, departments are required to train their members on the new standard within a year. Independent Service Providers (ISPs) that clean, inspect and repair clothing have up to 2 years to be verified to the new standard depending on how recent their last verification was. The NFPA 1852 portion of the standard does not set a specific implementation schedule but fire departments are expected to comply as soon as practically possible.

TABLE 2
Significant modifications in NFPA 1850

NFPA 1851 Portion on Turnout Gear	NFPA 1852 Portion on SCBA
New roles of PPC Manager and Technician	New care/maintenance details for SOPs
Additional consideration for gear selection	Modified retirement criteria
Greater flexibility for machine washing of non-garment elements	Revamped cleaning approaches
Changed parameters for gear cleaning	
Some new inspection and testing details	
Updated/expanded ISP verification procedures	

NFPA 1851 portion on turnout gear

Gear program responsibilities

The revised NFPA 1851 establishes two new roles within departments: the **Personal Protective Clothing (PPC) Manager** and the **PPC Technician**. The PPC Manager is tasked with oversight of the protective clothing program, while technicians conduct detailed maintenance and repairs. Although qualifications are not rigidly defined, annex guidance outlines the specific responsibilities for each position. These roles may be collateral duties or formally assigned positions, providing a structured framework to ensure gear programs are properly managed and PPE expertise exists within the department.

Gear selection

Selection provisions now emphasize risk assessments and consideration of multiple performance factors in light of the hazards and risks encountered by the organization. As part of new requirements, departments must:

- Weigh the trade-offs between thermal insulation versus thermal comfort or stress-related effects of the material composite.

- Evaluate interfaces between gloves, hoods, helmets and coats, and between pants and footwear.
- Consider restricted substances and regulations related to restricted substances such as azo dyes, flame retardants, heavy metals, PFAS, solvent residues, and volatile organic compounds.
- Ensure appropriate eye and face protection devices are used for each type of incident.
- Define a process for determining proper fit.

The table below lists many of the different types of exposure hazards and risks that exist for structural or proximity firefighting as well as related emergency response activities. A newly-added Annex D in the new standard provides a sample fire department risk assessment program.

The standard also introduces a recommendation for pre-cleaning new gear upon its receipt, which improves its flexibility for initial wearing and helps remove any residual finishes or substances that may be present on the gear after assembly and final manufacturing.

TABLE 3

Categorization of hazards encountered in structure firefighting

Physical Hazards	Thermal Hazards	Chemical Hazards	Person-Position Hazards
Falling objects Flying debris Projectiles or ballistic objects Abrasive or rough surfaces Sharp edges Pointed objects Slippery surfaces Excessive vibration	High convective heat Low radiant heat High radiant heat Flame impingement Steam Hot liquids Molten metals Hot solids Hot surfaces	Inhalation Skin absorption or contact Chemical ingestion or injection Liquefied gas contact Chemical flashover Chemical explosions	Daytime visibility Nighttime visibility Falling Drowning
Environmental Hazards	Biological Hazards	Electrical Hazards	Person-Equipment Hazards
High heat and humidity Ambient cool Wetness High wind Insufficient or bright light Excessive noise	Bloodborne pathogens Airborne pathogens Biological toxins Biological allergens	High voltage Electrical arc flashover Static charge buildup	Material biocompatibility Ease of contamination Thermal comfort Range of motion Hand function Ankle and back support Communication ease Fit (poor) Ease of donning and doofing
		Radiation Hazards	
		Ionizing radiation Non-ionizing radiation	

Gear cleaning

The types of cleaning that gear can be subjected to were wholly redefined in the creation of the 2020 edition of NFPA 1851, which preceded the current new edition.

- **Preliminary exposure reduction** is an action taken on the fireground before the firefighter removes their PPE where the exterior of the clothing and equipment is first rinsed off, then lightly scrubbed with a brush and detergent before being rinsed off a second time. As the title implies, this is only an initial part of the process to remove most surface contaminants, but it is not full cleaning.
- **Advanced cleaning** is a thorough cleaning of the individual clothing items and equipment, where either machine-based or manual methods of cleaning are used to remove most fireground soils and contaminants, which may or may not be fully effective, depending on the level of contamination. For garments, hoods and sometimes helmet textiles and gloves, a specialized front-loading machine called a washer/extractor is used to provide the needed rigorous cleaning. There are also alternative machine processes such as ultrasonic cleaning.
- Sometimes, advanced cleaning may not be sufficient, warranting the use of **specialized**

cleaning. Specialized cleaning processes are either enhancements to advanced cleaning such as presoaking or extra wash cycles that are not undertaken routinely, or entirely different processes to address when heavy soiling and/or heavy contamination occurs, or if there is exposure to unusual substances.

- **Sanitization** refers to the neutralization or inactivation of biological contaminants such as bacteria and viruses to a safe level. Sanitization involves reducing the microorganisms present to 1/1000 of their original number and is typically relevant to porous surfaces such as fabrics. In contrast, **disinfection** is the near total eradication of the microorganisms present to at least one millionth of their starting population. Sanitization and disinfection do not necessarily remove the microorganisms or the soils associated with biological contamination (e.g., blood components) and generally must be undertaken first and followed by advanced cleaning. In some cases, advanced cleaning or specialized cleaning can accomplish sanitization as well as soil removal.

Advanced cleaning is supposed to be performed whenever gear is subject to soiling and contamination. Generally, the rule-of-thumb established in the previous edition is that exposure to smoke equates to an exposure that



Rinse during preliminary exposure reduction



Washer/extractor used for advanced cleaning



Soak tank that could be used for specialized cleaning

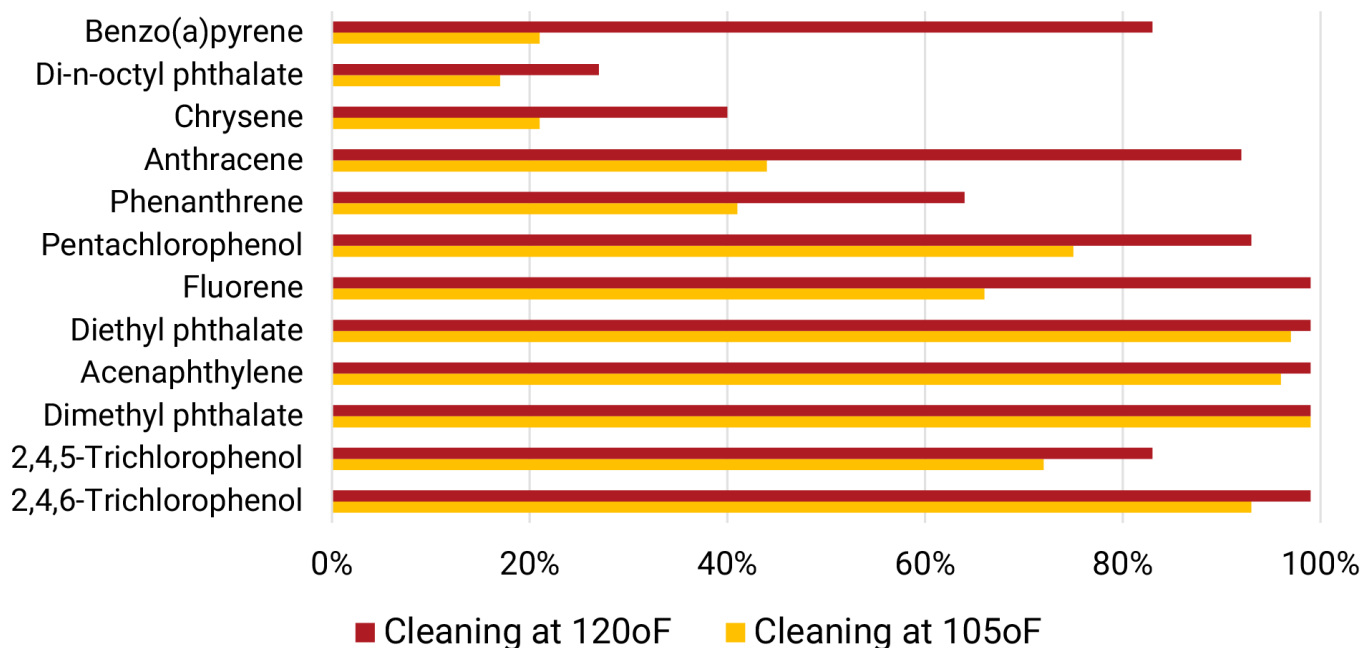
requires at least preliminary exposure reduction and advanced cleaning, or specialized cleaning when significant or unique contamination occurs. Sanitization must be applied when gear contacts potentially infectious materials. As a minimum, gear is supposed to be subject to advanced cleaning at least twice a year. This is unchanged from the previous edition.

For the new NFPA 1850, turnout gear cleaning requirements have undergone some of the most significant changes:

- For years, gear was limited to 105°F **wash temperatures** for advanced cleaning; the 2025 update raises this to 120°F, with specialized cleaning permitting up to 140°F. These changes stem from research showing greater contaminant removal at higher temperatures without unacceptable material degradation. Sample data below show differences for example selected fireground chemicals in the percentage removal of specific contaminants at the older and newer maximum wash temperatures (Source: Fire Protection Research Foundation: www.npfa.org/PPECleaning).

- Water hardness** is capped at 60 ppm to improve cleaning efficacy since hard water decreases the ability of water-based cleaning processes to remove contaminants.
- The range of **acceptable detergent pH** has been reduced to 6 (very slightly acidic) to 9.5 (mildly alkaline). In the earlier NFPA 1851-2020, these cleaning agents could have been as high as 10.5 (moderately alkaline).
- Machine cleaning** – preferred over hand washing for consistency – is now extended to helmets, gloves and footwear. Advanced technologies such as liquid CO₂ cleaning have been introduced, offering higher contaminant removal efficiency, particularly for organic and oil-based chemicals. Other machine technologies are emerging but require verification to ensure garment integrity is not compromised.

Contaminant Removal Efficiencies



Extensive guidance is provided in Annex A of the new standard with suggestions for configuring wash loads, choosing washer/extractors, detergents, sanitizers and other cleaning products and undertaking various parts of the cleaning procedures.

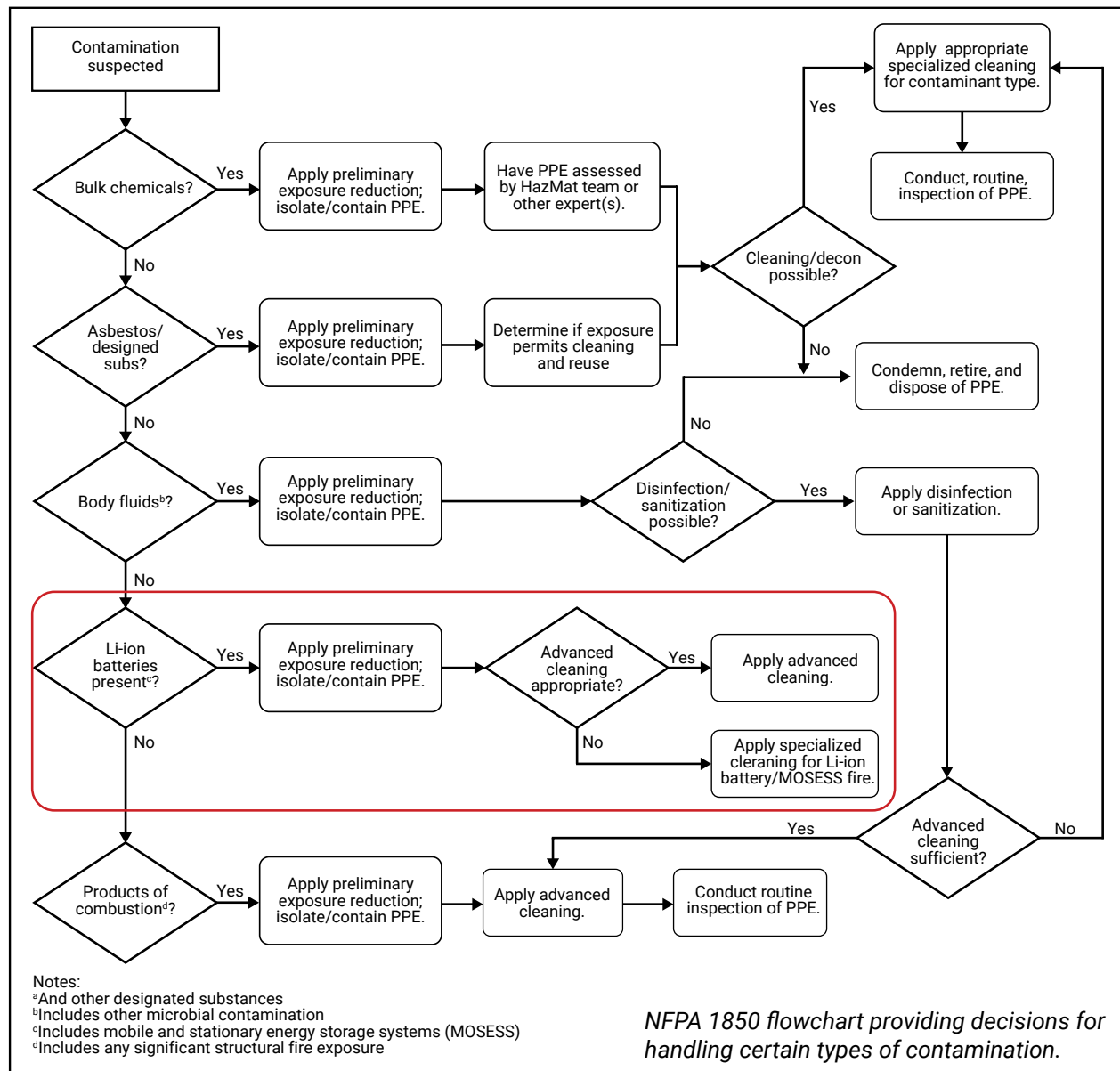
The new standard also acknowledges lithium-ion battery fires as unique contamination hazards, providing decision criteria to determine whether specialized cleaning is required, as shown below.

Key factors for determining if specialized cleaning is warranted include the following:

- Proportion of fire associated with Li-ion batteries.
- Degree of firefighter exposure.

- Environmental conditions.
- Availability of contaminant measurements.
- Prior experience with Li-ion fires.
- Independent documentation for cleaning process effectiveness.
- Ability to perform pre- and post-fire exposure cleaning analysis.

The above questions are accompanied by guidance information in Annex A of the new standard. Further, a placeholder has been provided for the future addition of more detailed procedures for cleaning when contamination occurs where lithium-ion battery or related storage systems are involved in structural fires.



Gear inspection and repairs

For inspections and any handling of gear, **universal precautions** – treating all gear as contaminated until cleaned – are emphasized. This means that individuals should wear examination gloves, protective sleeves and aprons, a faceshield and a filtering facepiece respirator.

The prior edition of NFPA 1851 entailed extensive lists for **routine inspections** of gear carried out generally by the individual firefighter. Except for some additional attributes specified to particulate-blocking hoods and examining whether the boot outer sole is separating or peeling away from the upper, these lists have been maintained with a comprehensive chart provided in Annex A of the new standard.

Advanced inspections must be conducted at least once a year. It is recommended that this inspection be in conjunction with advanced cleaning. Advanced inspections must be undertaken by trained individuals and entail a more thorough examination of the gear that can be coupled with simple tests, such as hydrostatically testing portions of the moisture barrier to verify continued liquid holdout capabilities.

New inspection requirements now include:

- Undertaking a full garment liner inspection in all advanced inspections.
- Separate tests for evaluating glove and footwear liquid integrity.
- A light inspection test to assess the continuity of the particulate-blocking layer in hoods.

The light inspection test for hoods is one way for testing the integrity of the hood's ability to prevent soot particle passage through the hood composite materials as shown below where bright spots show developed gaps or damage to the blocking layer.



Light device used for assessing integrity of hood particulate blocking layer



Hood placed on device for evaluation

Generally, advanced inspections had not been applied to stored or unissued gear. With the new standard, even unused gear must undergo advanced inspection after three years.

Repair allowances have been clarified to delineate what may be done at the department level versus what must go to an independent facility. The standard still differentiates between **routine repairs** – those that can be undertaken by the department when trained by the manufacturer – and **advanced repairs**. Advanced repairs generally extend to more complex repairs that require additional skills or equipment that can only be properly undertaken at an authorized facility (i.e., ISP) or by the manufacturer.



Gear storage, transport and retirement

Gear storage practices are evolving. Previously, gear was often kept in apparatus bays or even living quarters, exposing it to diesel exhaust and UV damage. Historically, NFPA 1851 required separate storage areas that are clean, dry, well-ventilated and away from UV light such as specific gear rooms. The standard prohibits transporting contaminated gear in the cab of an apparatus or other vehicle unless in a bag or other container. For the new NFPA 1850, specific different storage practices are prescribed for on-duty, off-duty and in-transit gear (gear being sent to an ISP or cleaning facility).

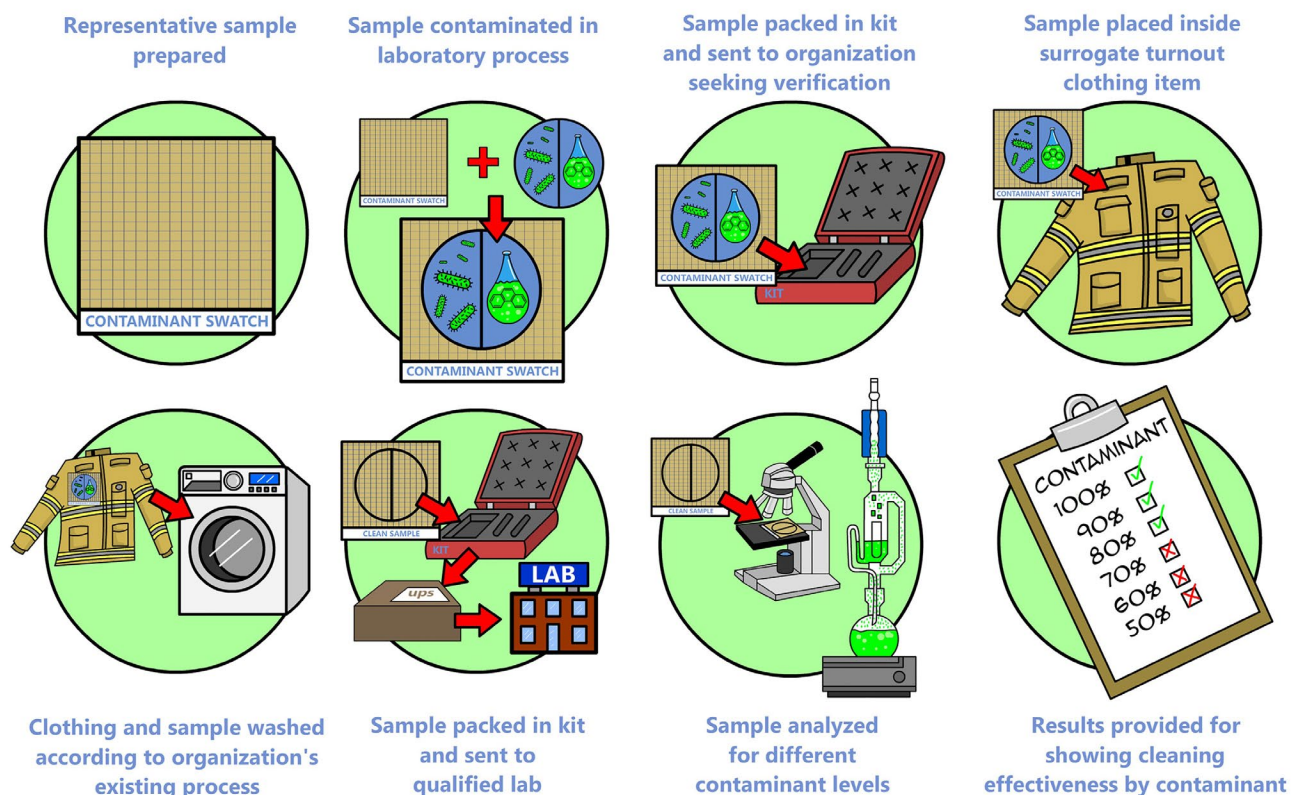
Retirement remains fixed at no more than ten years from the date of manufacture, a continuing requirement based on the following reasons:

- Potential changes in product standards where gear technology becomes outdated or lessened in performance.

- The degradation of clothing materials and other components over time from both use and frequent care.
- The accumulation of contaminants where some types of substances may not be adequately removed and thus build up over time.
- Most importantly, the absence of reliable nondestructive tests for continued performance.

It is recognized that some clothing items, particularly hoods and gloves, are unlikely to last 10 years if regularly used. Further, the 10-year rule still applies even when the gear remains in storage unused. Thus, it is recommended that gear be rotated to get utility of aging products.

CLEANING VERIFICATION KIT PROCESS



Verification of ISPs and facilities

Originally, companies that offered services for the cleaning, inspection and repair of firefighter protective clothing were subject to independent oversight from a certification organization, known as a process of verification. Initially, verification included a review of a facility's procedures in the care and maintenance of gear along with evaluating the efficacy of certain repairs. In 2020, this assessment was extended to minimum cleaning and decontamination capabilities using the kit-based approach shown above.

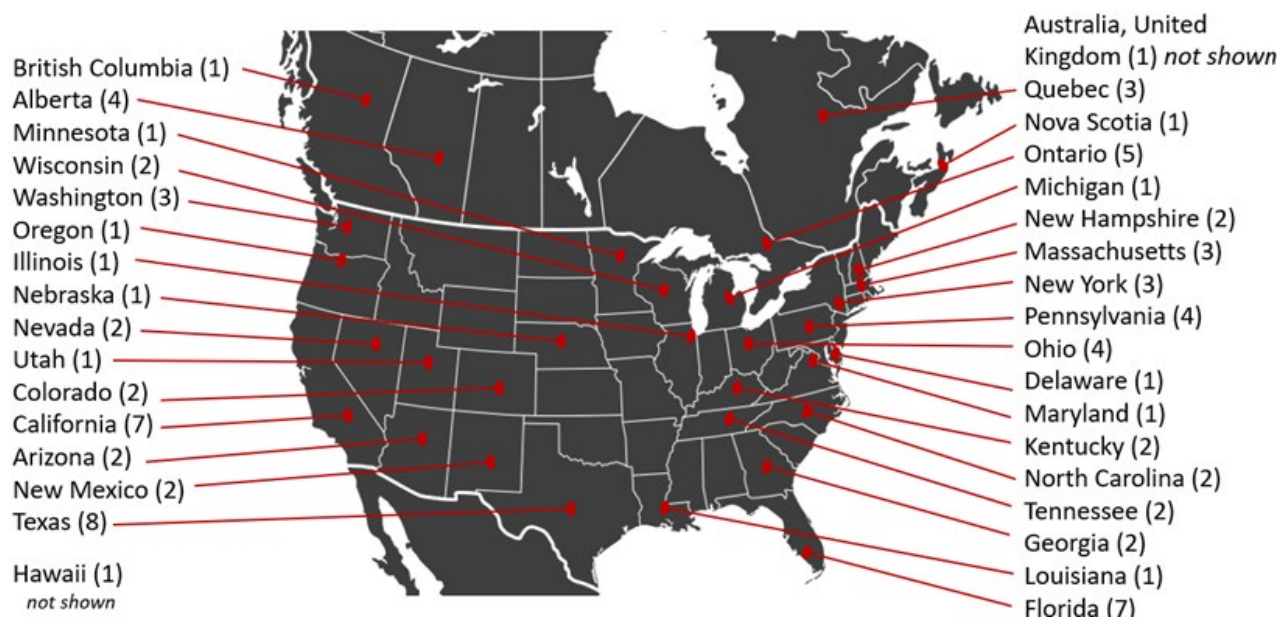
In essence, the kit-based approach involves contaminating sample garment materials with known amounts of either specific chemical or biological contaminants that are sent to the ISP. These specimens are placed in special pockets of surrogate full garments and subjected to the cleaning according to the facility's normal operating procedures. These "cleaned" specimens

are returned to the laboratory and evaluated for remaining contamination where effectiveness is reported in a percentage reduction (chemicals) or logarithmic reduction (bacteria).

Verification programs for independent service providers (ISPs) originated from the "How Clean is Clean" research project from the NFPA's Fire Protection Research Foundation. The baseline removal efficiency was set at 50% for chemical contaminants, reflecting the average cleaning performance achievable. Since that time, the number of verified ISPs and other types of facilities has grown as shown in the geographic representations shown in the following map.

The 2025 edition strengthens verification by requiring public disclosure of results and adding optional categories for PFAS and PAH removal. Before, verified facilities were simply listed as meeting the standard. The new NFPA 1850 will require that actual efficiencies that arise from cleaning tests be made available by

Current Verified ISP, Cleaner, Manufacturer, Fire Department Locations



the certification organizations that oversee the verification process. The new optional categories further allow different facilities to report additional cleaning data on a larger number of chemicals and provide results for how multiple cycles of their cleaning processes affect gear performance properties.

Improvements were also made to the kit procedures to make them more efficient and reliable. As a consequence, departments can now rely on verified facilities, with the assurance that processes meet minimum contamination reduction levels and are subject to greater oversight.

NFPA 1852 portion on SCBA

SCBA program elements

NFPA 1852 for SCBA selection, care and maintenance shares several of the same elements as for turnout gear in the NFPA 1851 portion of the new standard. NFPA 1852 historically placed greater reliance on manufacturer instructions and authorized SCBA technicians. The 2025 update maintains this approach but expands requirements for SOPs covering cleaning, maintenance and reporting of adverse conditions. Documentation and recordkeeping are emphasized, while service

life criteria now allow SCBA to remain in use for up to 20 years depending on certification edition and applied upgrades, among other factors.

This latter provision is significant since the modernization of SCBA through upgrades is intended to bring older edition SCBA forward to compliance with a newer edition through the provision of new features, equipment capabilities and labeling. This ensures that SCBA technology does not get too far out of date, particularly when new edition product standards can bring about highly impactful performance differences.

NFPA 1852 uniquely addresses the provision of quality assurance for the fire department SCBA program. It further establishes the need for technical authorization by the manufacturer for use of qualified SCBA or respiratory equipment technicians in carrying out specific maintenance functions including inspection, repair and servicing. The standard further points toward the department making the manufacturer's care and maintenance instructions available to its members. It further states that the department should follow the manufacturer instructions if there is a conflict of the instructions with a specific NFPA 1852 requirement.



SCBA selection

A selection approach is prescribed for conducting a hazard/risk assessment that is coupled with the consideration of several specific product features and attributes as well as minimum steps for a field evaluation process. This hazard/risk assessment is different than the one provided for turnout gear in the NFPA 1851 portion of the standard. Examples of necessary considerations for SCBA selection include:

- SCBA size, weight and rated service time.
 - Ease of donning and doffing, comfort, fit range and number of available facepiece sizes.
 - Operability when wearing gloves.
 - Communications capabilities, characteristics of end-of-service life indicators, and types and ease of filling air cylinders.
 - Available accessories (telemetry, monitoring, personal locating systems, integrated PASS, emergency egress escape systems and universal emergency breathing safety systems (UEBSS)).
- Ability to integrate or interface with different protective ensemble elements, accountability systems, transportation seating and various escape devices.

This portion of the standard further goes on to identify specific criteria that should be provided for as part of the department's development of purchase specifications. Examples of additional criteria include:

- Quantitative, user, and maintenance fit training.
- Manufacturer assistance to develop SOPs for SCBA maintenance.
- SCBA testing on site prior to acceptance.
- Provision of information for maintenance, such as the maintenance schedule, requirements for specialized equipment or tools, and a list of authorized service centers.
- The need for an optional emergency escape breathing safety systems (EBSS) or supplemental voice communications systems.
- The provided warranty and procedures for returning items found defective upon initial receipt.

SCBA care

Cleaning terminology is now aligned with turnout gear: preliminary exposure reduction, routine cleaning, advanced cleaning and specialized cleaning are terms that are applied for SCBA cleaning for consistency throughout NFPA 1850.

- Departments are required to establish their SOPs to reflect these cleaning practices.
- Departments may use mechanical washing systems for SCBA, provided verification by the equipment provider demonstrates no damage to the protective performance of the SCBA. However, there are no specific requirements yet for showing if such equipment is effective in removing contaminants.
- Disinfection and sanitization are now practices that have to be included as part of department procedures, particularly as related to facepieces.
- Specialized cleaning is newly recognized as potentially necessary for SCBA when highly contaminated or exposed to unique chemical or biological hazards.
- Universal precautions apply here as well: SCBA is treated as contaminated until proven otherwise.



Hand washing of SCBA facepiece.



Special washing machine for SCBA and other PPE.



SCBA storage

SCBA storage guidance reflects evolving practices. In the past, units were stored in apparatus bays, risking contamination spread. The new standard highlights options for storage in cases, mounting on walls, or within apparatus cabs, but with caution toward clean cab concepts to avoid contaminating crew areas.

SCBA maintenance

Inspection and maintenance requirements remain largely unchanged. Departments must inspect facepiece clarity, requalify breathing air cylinders and ensure repairs are performed only by manufacturer-authorized technicians.



Authorized inspection and testing of SCBA at the fire department.

SCBA retirement

SCBA retirement rules have been updated. Units certified to earlier editions may remain in service if they undergo manufacturer-approved upgrades. Soft-good harness components are often replaced more frequently due to UV degradation and contamination risk. All SCBA must be destroyed or rendered unusable upon retirement, preventing reuse.

Reporting of adverse conditions involving PPE

For both turnout clothing and SCBA, NFPA 1850 provides specific instructions for how organizations can address situations involving protective ensembles, SCBAs or their components that lead to failure, near-failure or significant degradation of performance because of normal use.

- For the NFPA 1851 portion of the standard, fire departments are required to report these events to both the manufacturer and the certification organization. Certification organizations are obliged to investigate the circumstances under the product standard (NFPA 1970) and provide findings if warranted. This reporting structure is separate from reporting of incidents with serious injury or

fatality, which is covered under a separate section that addresses what are called “special incident procedures.”

- Under NFPA 1852, additional provisions exist to notify the National Personal Protective Technology Laboratory of the National Institute for Occupational Safety and Health (NIOSH) and undertake specific actions such as removal of the equipment from service, securing the equipment and providing documentation for a chain of custody.

Summary

NFPA 1850 represents the further extension of a cultural and technical shift for the improvement of PPE care and maintenance. By consolidating NFPA 1851 and NFPA 1852, the standard improves clarity, consistency and accountability. Key changes include new departmental roles, expanded cleaning requirements, mandatory verification of ISPs and updated service life criteria. Together, these provisions aim to reduce contamination exposures, extend safe service life and better protect firefighters. **1)**



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