

**! DANGER**

Always clean and thoroughly dry Garments used in any structural firefighting operation. Soiled or contaminated Garments may be combustible, causing serious burns to the wearer.

**! WARNING**

To reduce the risk of harm from hazardous substances present in the products of fire combustion, or hazardous chemicals, you **MUST** wash your Garments.

## 11. WASHING, DECONTAMINATION, AND DISINFECTION

### 11.1 HAZARDS OF DIRTY GARMENTS: WHY WASHING AND DECONTAMINATING IS IMPORTANT

You can be exposed to many hazardous substances on the job. These substances can contaminate your Garments, and cause harm to you after your body contacts your Garments. This section tells you how to wash and decontaminate your Garments to reduce these hazards.

**Routine Fireground Contaminants:** Many fire combustion products — including hydrocarbons, polynuclear aromatic compounds, metals such as cadmium and chromium, acids and soot — are hazardous to the firefighter. These substances can become embedded in the fibers of your Garments, penetrate inner layers, and enter the body through absorption, inhalation, parenteral contact and ingestion. In addition, particulates and other products of combustion can reduce the flame resistance of your Garments and increase your Garments' ability to conduct electricity. To reduce the risk of long-term harm from hazardous substances present in the products of fire combustion, or hazardous chemicals, you **MUST** wash your Garments.

**Hazardous Chemicals:** If you experience accidental or incidental exposure to a hazardous chemical, follow all precautions in this Section to limit exposure and risk of harm to yourself and others.

You should hose down contaminated Garments at the scene to limit further exposure to hazardous chemicals, to reduce exposure to others, and to prevent chemicals from settling into your Garments.

**! WARNING**

Decontamination of protective clothing and equipment is a complicated process for which there is no guarantee that protective elements are free from contamination. While the purpose of decontamination is to remove all contaminant(s) from the element, decontamination procedures or cleaning processes are not always 100% effective in removing all contamination. See NFPA 1851.

**Bloodborne Pathogens:** Your Garments may be exposed to body fluids that may contain bloodborne pathogens. The washing procedures described later in this section will reduce your risk of infection from these hazards.

### 11.2 FREQUENCY

Clean Garments at least annually or as soon as possible after exposure to products of combustion, as well as contamination or exposure to smoke, blood or body fluids, or hazardous substances.

**! WARNING**

Always wash your Garments separately from other items. Never wash your Garments at home or at public laundry facilities to avoid the spread of chemical contamination or hazardous combustion products to other laundry.

**! WARNING**

Never use high velocity power washers or pressure hoses for washing Garments. These tools can severely damage the raw materials and seams.

### 11.3 CLEANING PRODUCTS

#### Routine Washing:

- A. Commercially available detergents. Use commercially available detergents with a pH greater than 6.0 and less than 10.5. Many household detergents fall within this range.
- B. Specialty Cleaners. StationCare 1851 from LION TotalCare® is designed for NFPA 1971 Garments. Always read SDS before use.
- C. Spot cleaning and pre-treating. Use commercially available detergents with a pH greater than 6.0 and less than 10.5. Always check SDS and product's instructions before use.



StationCare 1851 is available online at [www.lionprotects.com/totalcare](http://www.lionprotects.com/totalcare).

#### **⚠ WARNING**

Never use chlorine bleach or chlorinated products to clean your Garments. Even small amounts of chlorine will seriously reduce your Garment's protective qualities. Non-chlorinated bleaches are acceptable.

### 11.4 SPOT CLEANING

- A. Use a cleaning product that is safe for use on protective clothing fabrics to clean light spots and stains on Garments.
- B. Apply the cleaner one or two times on soiled areas according to the cleaning product's instructions on dilution and application. See Section 11.3 for guidelines on cleaning products.
- C. For outer shells only, use a soft bristle brush (toothbrush or fingernail-type brush dipped in water) to gently scrub the soiled area for 1 or 2 minutes. For inner liner materials, gently rub the fabrics together.
- D. Thoroughly and carefully rinse Garment with cool water.

Contact LION or a LION TotalCare® Center for additional information about the compatibility of cleaning products with protective clothing.

#### **⚠ WARNING**

Do not use petroleum-based solvents to spot clean. These products may reduce the limited protective qualities of the Garment.

### 11.5 PRETREATING

- A. Apply pretreating product onto the soiled areas according to the pretreating product's instructions on dilution and application.
- B. Thoroughly and carefully rinse the Garment with cool water.
- C. Place Garment into washing machine and follow the wash procedures in this section.

### 11.6 HEAVILY SOILED AREAS

- A. Air dry Garment before applying cleaning product.
- B. Saturate the heavily soiled and surrounding area according to the cleaning product's instructions on dilution and application. Follow the cleaning product instructions for duration of soaking.
- C. For outer shells only, use a soft bristle brush (toothbrush or fingernail-type brush dipped in water) to gently scrub the soiled area for 1 or 2 minutes. For inner liner materials, gently rub the fabrics together.
- D. Thoroughly and carefully rinse Garment with cool water.
- E. Repeat steps B-D if necessary.
- F. Place Garment into the washing machine as instructed in the wash procedures in this Section.



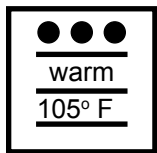
no chlorine bleach

## 11.7 MACHINE WASHING

### Preparation

Before washing, make sure you comply with all federal, state, and local guidelines for handling effluents from utility sinks. ALWAYS wash shells, liners, DRD and suspenders separately to avoid redepositing soil from one component to the other.

- A. Detach outer shells from the inner liners. Remove DRD or suspenders. Hold the pants suspender button when removing suspender clips to extend the wearlife of the suspender button. Twist snaps to loosen when removing the liner system to extend their wearlife.
- B. Hand wash DRD and suspenders with a mild detergent and soft bristle brush, rinse thoroughly, and hang the DRD and suspenders to air dry AWAY FROM DIRECT OR INDIRECT SUNLIGHT, FLUORESCENT LIGHT OR SHARP OBJECTS. See Section 11.3 for guidelines on cleaning products.
- C. Pretreat heavily soiled Garments following steps in the Spot cleaning and Pretreating procedures, in Sections 11.4-11.6 of this Guide.
- D. Where provided, fasten all hooks and dees or other metal parts and turn the Garment inside out or place in a large laundry bag that can be tied shut to avoid damage to the Garment or to the wash tub.
- E. Fasten all hook and loop closures to each other to reduce the likelihood of damage to delicate parts of your Garments.
- F. Wash shells and liners separately to avoid possible damage to the liner caused by hardware and to avoid cross contamination.



water  
temperature



machine  
wash cycle



no chlorine  
bleach

### Machine Settings

Use a front loading extractor or front loading washing machine with a tumbling action for washing. Do not use a top-loading machine, because it will not wash your Garments as thoroughly, and the agitator may damage the Garment and reduce its durability and protective value.

Use the following machine settings:

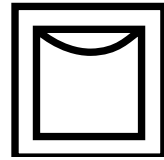
- A. Wash temperature should not exceed 105° F (40° C).
- B. Normal Cycle.
- C. Use low extractor speeds less than 100 g's.
- D. Double Rinse Double rinsing removes residual dirt and insures detergent removal. If your machine will not automatically double rinse, a complete second rinse cycle should be run without adding detergent.

### Wash Procedures

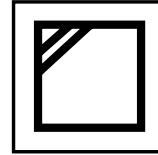
- A. Load machine with Garments to be washed. Follow machine manufacturer's instructions for proper load size. Overloading the machine can lead to incomplete cleaning and other poor cleaning results.
- B. Add cleaning product per manufacturer's instructions. Never use Chlorine bleach; non-chlorine bleach may be used. Ensure accurate measuring tools are used for correct amount of cleaning product. See Section 11.3 for guidelines on cleaning products.
- C. Set washing machine on normal cycle and start the wash cycle.

## 11.8 DRYING

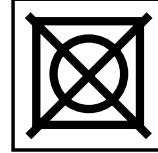
- A. Remove Garments from washing machine, and if they are not already inside out from washing, turn them inside out to expose the inner surfaces. Dry by hanging in a shaded area that receives good cross ventilation or use a fan to circulate the air.
- B. Do not use automatic dryers because the mechanical action and excessive heat may damage or shrink your Garments.



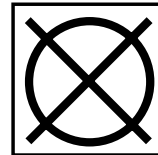
line dry/  
hang to dry



in the shade



never  
tumble dry



never  
dry-clean

### **⚠ WARNING**

Do not hang Garments to dry in direct or indirect sunlight, or in fluorescent light. Light will severely reduce the strength of the seams, and will discolor and greatly reduce the strength and protective qualities of the components of the Garments.

## 11.9 DO NOT DRY CLEAN

Never dry-clean your Garment. Dry-cleaning will damage the Garment and reduce its protective qualities.

## 11.10 CONTRACT CLEANING

LION recommends that only a LION TotalCare® Center or verified ISP be used for contract cleaning.

## 11.11 HAND WASHING IN A UTILITY SINK

LION does **NOT RECOMMEND** this method for washing your Garments. However, if no other options are available, hand washing is preferable to no washing.

**Preparation:** Before washing, make sure you comply with all federal, state, and local guidelines for handling effluents from utility sinks. Wear rubber gloves to protect against exposure to contaminants. Detach inner liner from outer shell as indicated in the machine washing instructions.

**Cleaning Products:** Use same cleaning products as used for machine washing.

**Procedures:** Make sure water temperature does not exceed 105° F (40° C). Using a hand brush, gently scrub surfaces of inner liner and outer shell. Overscrubbing may damage your Garment's materials or reduce its useful life.

**Drying:** See Section 11.8 for drying procedure.

## 11.12 DO NOT BRUSH WASH ON FLOOR OF STATION

LION does **NOT RECOMMEND** brush washing your Garment on the floor of the station because this method is not effective and may damage it.

## 11.13 DECONTAMINATION AND DISINFECTION

**Applicable Standard.** You must read and have facilities and procedures in compliance with NFPA 1581 Standard for Fire Department Infection Control Program.

### **⚠ WARNING**

To reduce risk of harm from hazardous substances present in products of fire combustion, hazardous chemicals, and body fluids, you **MUST** wash, decontaminate and/or disinfect your Garments after each exposure to such hazardous substances.

**Preparation:** Remove contaminated and infected Garments from wearer and from service before beginning. Garments should remain out of service until decontaminated and disinfected. Wear protective gloves and appropriate protective clothing and equipment while decontaminating and disinfecting.

### **⚠ WARNING**

Never Dry-Clean your Garment.  
Many Garment components will not function if dry-cleaned.

### **⚠ WARNING**

Only a trained expert in decontamination should attempt to decontaminate Garments. Contact a LION TotalCare® Center or verified ISP to seek assistance in determining whether decontamination is possible, and the name of the appropriate organization to perform decontamination.

**A. Hazardous Substances Present in the Products of Fire Combustion (Soot, Smoke, and Debris).**

To reduce the risks associated with exposure to the hazardous substances found in the products of fire combustion, you MUST wash, dry, and store your garments according to the procedures in this section.

**B. Hazardous Chemicals**

1. Hose down contaminated Garments at the scene to limit further exposure to hazardous chemicals, to limit exposure to others, and to limit chemicals from settling into your Garments.
2. **KNOWN MATERIALS:** Contact the source of the materials, your local HAZMAT Team, or the Health Department to determine whether the contaminants are hazardous materials. If the contaminant is known, contact a LION TotalCare® Center or verified ISP to determine the feasibility of decontamination.
3. **UNKNOWN MATERIALS:** If the contaminant is not known, Garments should remain out of service until the materials are identified. Always demand SDS information and be prepared to share your findings with the LION TotalCare® Center or verified ISP to decontaminate the Garments. **If your Garment cannot be decontaminated, it must be retired and disposed of in accordance with federal, state, and local regulations.**

If you have questions concerning the use of a particular disinfectant, contact LION, a LION TotalCare® Center, or verified ISP.

**C. Blood and Body Fluids**

1. **Disinfecting Products.** You must use disinfectants that are compatible with NFPA 1971 Compliant Garments.
2. **Disinfecting Procedure for Blood and Body Fluids**

**Small incidental areas:** Use spot cleaning procedures described in Section 11.4, and use an appropriate disinfectant available for Garments. Always follow the instructions of the manufacturer regarding product usage. Wash Garments thoroughly after spot cleaning in accordance with procedures in this section.

**Large areas:** If Garments have large areas of coverage of blood or body fluids, place and transport Garments in bags to prevent leakage. Contact a LION TotalCare® Center or verified ISP to arrange for disinfection.

**! CAUTION**

Personnel involved in the handling, sorting, bagging, transporting, and laundering of contaminated Garments must wear utility gloves and appropriate protective clothing to prevent occupational exposure during these activities.

**11.14 LAUNDRY SAFETY**

Laundry and Housekeeping Personnel are considered to be among those at risk to not only hazardous materials, but also to bloodborne pathogens primarily by exposure to sharp objects. Your Fire Department should have a Bloodborne Pathogens Written Exposure Control Plan. Part of this plan is decontamination, disinfection, and washing of Garments, and it should include LAUNDRY ROOM SAFETY PROCEDURES and HOUSEKEEPING SAFETY PROCEDURES. You should follow all appropriate federal, state, and local regulations.