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PPE Update

## Can firefighting gear be decontaminated on scene?

**With no standards to guide us, the best way to do gross decontamination on scene is anyone's guess**

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It is a reoccurring theme that firefighters are exposed to harmful particulates and chemicals during structural fires, that many of these contaminants are persistent and that rates of certain cancers among firefighters are increasing.

While there are a number of specific actions fire departments can take to minimize fireground exposure or reduce the effects of exposure, one of the more potentially effective practices is on-scene gross contamination.

Yet, the key questions remain: Exactly what is gross contamination and is it practical for many fire departments?

There are no standards on gross decontamination. You won't be able to find the term in **NFPA 1851**, the standard that covers selection, care and maintenance of structural firefighting protective clothing. According to the standard, cleaning is "the act of removing soils and contaminants from ensembles and ensemble elements by mechanical, chemical, thermal, or combined processes."

NFPA 1851 defines three levels of cleaning: routine, advanced and specialized. Routine cleaning is "the light cleaning of ensembles or ensemble elements performed by the end user without taking the elements out of service."

This is in contrast to advanced cleaning, which is "the thorough cleaning of ensembles or elements by washing with cleaning agents," while specialized cleaning is "cleaning to remove hazardous materials or body fluids."

## **NFPA on decontamination**

NFPA 1851 address decontamination through the standard definition of "the act of removing contaminants from protective clothing and equipment by a physical, chemical, or combined process." However, the proscribed procedures for decontamination make the process seem to be more the exceptional fireground exposure, rather than the ordinary, as found in the following paragraphs that refer to decontamination.

***7.1.4:** Ensembles and ensemble elements that are known or suspected to be contaminated with hazardous materials shall be evaluated on the incident scene by members of the organization authorized by the organization to conduct a preliminary assessment of the extent of contamination and the need for ensemble or ensemble elements to be isolated, tagged, and bagged on scene.*

***7.1.4.1:** Contaminated ensembles and ensemble elements shall be isolated during the incident personnel decontamination process and removed from service until the contaminant or suspected contaminant is identified and the elements can receive specialized cleaning as necessary to remove the specific contaminant(s).*

***7.1.4.2:** Where possible and where the contaminant and its source have been identified, the organization shall consult the supplier of the contaminant and the manufacturer of the ensemble and ensemble elements for an appropriate decontamination agent and process.*

***7.1.4.3:** A member(s) of the organization who has received training in the cleaning of ensembles and ensemble elements shall be responsible for performing or managing specialized cleaning of elements contaminated with hazardous materials.*

***7.1.5:** Ensembles and ensemble elements that are known or suspected to be contaminated with body fluids shall be evaluated on the incident scene by members of the organization authorized to conduct a preliminary assessment of the extent of contamination and need for the ensemble or ensemble elements to be isolated, tagged, and bagged at the incident scene.*

## **Fire is hazmat**

This language infers that contamination occurs when hazardous chemicals, blood or body fluids contact turnout clothing and decontamination equals specialized cleaning. But as we have been pointing out over the past several years, structural fires are hazardous materials incidents.

These incidents produce environments that are immediately dangerous to life and health and a myriad of known and unknown toxic chemicals, many of which are carcinogens. So, if a firefighter uses his or her gear in a structural fire, does it need cleaning or decontamination?

Going back to the original definition of cleaning, cleaning is supposed to remove soiling and contaminants. However, if structural fires are events where contamination occurs and that contamination includes hazardous chemicals that are formed by the process of combustion, then shouldn't the protective clothing be subjected to specialized cleaning?

Certainly, structural fires are a lot more common than hazardous-materials incidents. And, the operating procedures, equipment and response tactics are clearly different.

The distinction between cleaning and decontamination may be partly semantics, but the reality is that the fire service should begin to treat clothing used at structural fires as more than just being soiled.

### **Why do gross decon?**

The problem with the definitions of cleaning and decontamination in NFPA 1851 is that the differences in the terms have become blurred as cleaning and decontamination of protective clothing becomes more important in the fire service as a basic occupational hygiene practice.

Gross decontamination commonly refers to actions taken at the fire scene to remove as much soil and contamination as possible without actually taking the clothing apart and cleaning it in a machine. There are differences of opinion and practice whether this also includes taking the clothing out of service for continued or more advanced cleaning.

The purpose of gross decontamination is remove contaminants as soon as possible following the exposure to limit member further contact with contamination. If a firefighter continues to wear his or her gear following the structural fire, then the exposure is prolonged.

This continued contact with contamination also occurs if the firefighter transports the clothing in their private vehicle (or the apparatus) and if the clothing is worn again before cleaning.

### **How we decon**

Certainly, taking the gear off is one way to interrupt the contamination process. But as soiled, contaminated clothing is worn, the contaminants have longer periods of time to be absorbed by the skin or to be inspired through continued off gassing.

There are no validated ways that gross decontamination is carried out. In some cases, the clothing is removed and hosed off at the scene. In other cases, compressed air might be used to blow away the particulates.

It is unknown if these processes remove most of the contamination or not, but work is underway to make such determinations. Some fear that dry decontamination (with compressed air) may simply drive the contamination further into the clothing and spread it into the breathing zone of the firefighters in the general vicinity.

Some departments have come up with more elaborate process with portable showers and may go to the extent of isolating gear until it can be fully cleaned.

The practicality of gross decontamination remains in question. If the department provides a second set of gear that is readily available, then the institution of such a practice becomes more possible.

Yet, departments face logistical concerns and cold or other harsh weather further pose other problems. The fire service is left to work within the resources it has available and some departments are certainly more progressive in this respect than others.

### **The best bet**

At a minimum it is important to get the gear off following the structural fire. It would be best to

remove as much soil — primarily soot and solid fireground contamination — as possible at the scene before transporting it back to the station.

The most common approach, rinsing down at the scene, is probably the most effective, but will also temporarily render the clothing unusable. If this is not practical, then the clothing should be temporarily removed to limit contaminant transfer and continued exposure of the firefighter.

Ideally, it should be isolated and cleaned as soon as possible. As the [Firefighter Cancer Support Network](#) also recommends, firefighters should shower and change into a clean work uniform as soon after the fire as possible.

Proceeding down this path strives to achieve a limitation of exposure to harmful substances just in the same way that the clothing itself is intended to provide protection during the emergency itself.

We realize that fire departments are going to have to adapt to these or similar procedures if they have not already and do so in the face of tight budgets and dwindling resources.

However, the statistics for increased firefighter cancers demand that proactive measures be taken and some form of gross decontamination is a first step.


## About the author

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Jeffrey and Grace Stull are president and vice president, respectively, of International Personnel Protection, Inc. They are members of several NFPA committees on PPE as well as the ASTM International committee on protective clothing. Mr. Stull was formerly the convener for international work groups on heat/thermal protection and hazardous materials PPE as well as the lead U.S. delegate for International Standards Organization Technical Committee 94/Subcommittees on Protective Clothing and Firefighter PPE. They participate in the Interagency Board for Equipment Standardization and Interoperability and have authored the book, "[PPE Made Easy](#)." Send questions or feedback to the Stulls via [email](#).

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