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Request Info



PPE Update

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Testing firefighter turnouts for contamination

The testing of contaminated PPE is most effective when there is reason to believe that specific chemicals are involved

By Jeffrey O. and Grace G. Stull

We frequently get questions about contaminated turnout gear. Fire departments and other organizations involved in emergency response contact us to find out if we can test garments and other clothing items for the presence of different chemicals.

The types of scenarios in which the gear becomes contaminated vary dramatically. In some instances, a fire response involves contact with the warehouse or other industrial facility where different chemicals are known to be present during the time of fire.

There may or may not be any instance of complaints or knowledge of actual exposure to these chemicals, but the concern exists that firefighters might have been exposed to some relatively hazardous substances.

Analyses are requested to determine if specific identified chemicals are present in the clothing. Sometimes it is possible to identify these chemicals and find out if they remain in the clothing and in what concentrations.

In other instances, the subject chemicals may no longer be present because they evaporated or were somehow altered in the fire. For example, it is well known that PCBs are transformed into dioxins and other highly hazardous chemicals when they are subjected to high temperatures.

Specific complaints

We encounter other situations where there has been a specific complaint about firefighters having rashes or some acute reactions following the fireground event.

In a majority of these cases, the fire department does not have any information to suggest what the firefighters might have been exposed to or, for that matter, if chemicals present at the fire scene are responsible for the observed health issues.

This type of investigation involves a much more difficult analytical challenge. It is like looking for a needle in a haystack because any number of chemicals could be responsible for the problems ensuing after fire response.

It often becomes a trial and error search to see if somehow a particular chemical might be identified in a sufficient quantity to be of concern. Many of these investigations end up with little information to help resolve the issue.

Only in a few instances have we been able to find some substance that might be responsible for causing a specific problem observed on the fireground.

Lastly there are other scenarios where fire departments have had a number of firefighters involved in a specific incident, have washed the gear, and yet have concerns about residual chemical that might not have been removed by the cleaning process.

These situations can involve circumstances where the chemicals have been identified, or where there is some unknown irritant or other substance suspected of causing potential health issues.

The analyses reflecting these scenarios are best performed by evaluating both decontaminated and contaminated gear. This approach provides the levels of contaminants found in both soiled and clean gear, as well as showing the effectiveness of the cleaning and/or decontamination processes.

Common request

In all the situations, there is a common request for gear to be analyzed and a report to be generated that can shed some light on whether the gear is still viable and if the gear is a source of continued chemical exposure to the wearer.

While these types of analyses can often yield results that are useful in helping departments make judgments about whether they should retain clothing, attempt further decontamination, or dispose of the gear, there are many limitations for the testing that is performed when examining for contamination levels.

Testing of contaminated turnout gear is most effective when there is reason to believe that specific chemicals are involved. The analyses can be designed to focus on identifying and quantifying those particular chemicals.

If the chemicals are indeed found in the clothing, then specific conclusions can be made about their persistence and if decontamination might be warranted. However, there are several caveats to even this best case scenerio testing.

As previously mentioned, many chemicals are altered when exposed to high temperatures and these altered chemicals may or may not show up in the same way as the original chemicals.

Some chemicals would not be expected to be discovered at all because they will simply evaporate or dissipate over time, leaving little residue for analysis. This means that there needs to be some understanding of the decomposition products that may result from the original chemicals identified.

In the next part of this article, we will focus on the actual samples that are to be used in the testing process.

About the author

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