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PPE Update

# Firefighter PPE: What NFPA changes may come

**Aside from gloves and hoods, look for the next NFPA 1971 to tackle moisture penetration into coats and pants**

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Standards are intended to provide a set of criteria by which firefighters can have some confidence that their turnout gear provides a minimum level of protection.

For the past 40 years, NFPA 1971 has provided these criteria and undergone seven major revisions going from a dozen pages to the current 145 pages. Where there used to be about 10 different tests for evaluating materials, components and clothing, now there are 74 different methods.

Moreover, when first introduced, the fire service was slow to adopt the standard with some manufacturers even disdaining subjecting their products to the NFPA requirements. Now, compliant rates for garments are better than 99 percent and no U.S. manufacturer would ever consider selling clothing in the U.S. market without it being certified.

Needless to say, the standard has had its impact on an industry that back in the 1960s relied mainly on modified rainwear for protection.

On the average, these standards are revised every five years; sometimes they may be short-cycled or extended. The heart of the revision process is public input; it is one of principal ways by which potential changes are identified. The technical committee responsible for the standard looks at these inputs and decides which to implement, modify or reject.

Proposed revisions are then subjected to a second review, or comment period, by which the public can make further suggestions for changes with additional deliberations by the technical committee to refine the final language. Changes can be relatively simple such as editorial correction or clarifications

of existing language, or they can be much more extensive such replacing whole tests and requirements with new methods and criteria.

### **Revision year**

This year the NFPA 1971 technical committee started its formal revision. The committee actually started the efforts for examining the standard and determining specific issues to be addressed back in 2014, but the public input period closed in early July.

Approximately 260 different public inputs were received, although most came from committee members. These represented an array of different topics including several intended to fix problems that occurred in the 2013 edition.

During that revision, several new test methods were added, particularly for gloves and footwear that were relatively untried, but were positioned to address industry complaints for how current products were being evaluated. Lessons learned from this process now include guidelines for how new test methods and criteria should be validated for their applicability, reproducibility and consistency.

Many of the public comments raised entirely new issues, while others attempted to address perennial problems. For example, one area that has plagued the committee over the past several editions has been whether helmets should include faceshields, goggles or both.

### **Eye protection, helmet breakup?**

For the past two editions, manufacturers are required to provide either a set of goggles or an attached faceshield with each certified helmet. In fact, if elected, goggles must be provided in the helmet box.

Those in the fire service have come down on both sides of this issue — some advocate the use of faceshields, others say goggles are more effective. The compromise has been to allow departments to choose either configuration.

There are others in the industry who contend that neither faceshields nor goggles should be required and that these items quickly diminish in their utility following a working fire and easily become a source of contamination. Added to this are accessories placed on the helmet and whether these items should be evaluated for any degradation effects on the helmet when exposed to heat and flame.

While the committee appears to be pressing forward with the status quo involving the choice of faceshields or goggles, the matter of accessories has gained some traction. New rules are likely to require manufacturers to identify which items are not part of the certified helmet. A recent amendment to the 2013 edition created this interpretation, but further committee work has refined this position for the next edition.

### **Fits like a ...**

Gloves have been a longstanding area of criticism. Of all the parts of the firefighting ensemble, affording sufficient thermal protection to the hands at the same level of garments or footwear is a significant challenge given the need for their functionality.

During the last edition, several changes addressed glove dexterity, grip and tactility, but many end users claim that industry offerings have not changed. In this edition, is creating an entirely new glove sizing system with the objective of better fitting the overall male and female firefighter populations.

In addition, a series of new tests are being investigated to provide ways to evaluate the insulation on the back of the hands that is more consistent with field observations. Providing the correct balance of insulation and functionality is an extremely difficult proposition.

Moreover, glove shrinkage at the fire scene is now receiving attention. Some claim that the manner in which gloves are tested may impede the normal shrinkage that takes place under relatively extreme conditions and not reflect field performance.

### **Garment changes**

For garments, it has been perhaps 15 years since total heat loss became a mandatory requirement for breathability of composite materials used in turnout coats and pants.

This requirement has had a profound impact on the garment industry. It removed impermeable neoprene moisture barriers and made clothing lighter weight, essentially dictating that manufacturers balance thermal protection with stress reduction in their selection of materials.

As the science of measuring the effects of clothing on individuals has evolved, the committee is now considering a new measure, evaporative resistance, which may provide supplemental information to further fine tune clothing material choices. This may mean adding a new test and additional criteria to establish the acceptability of material systems.

Perhaps the most significant proposed changes pertained to contamination resistance. Several public inputs were submitted to address improved outer-shell performance against the absorption of water and liquids, the likelihood that clothing will be cleaned more frequently, and how ensembles keep out particulates and liquids.

One significant change was to introduce a new category of a particulate and liquid protective ensemble. The idea is to evaluate an entire ensemble consisting of garments, helmet, hood, gloves, footwear and SCBA face piece to show that the entire system limits the amount of particulate and liquid that penetrate to the wearer's skin.

### **Hood revisions**

Understandably, such systems are not likely in place today, but the proposed testing approach and criteria are intended to establish this level of performance so that department can choose this form of protection, if warranted.

A related set of inputs addresses hoods. Work is being done on several proposed changes for how the hood opening is defined to ensure that hoods retain their shape and coverage.

However, the one larger revision is the concept of an optional barrier hood. With hoods providing little or no liquid or smoke particle protection, the proposal calls for separate hoods to be designed and evaluated to show that these forms of protection can be addressed.

Moreover, to ensure that the barrier hood does not become an increased factor for heat stress, high-breathability requirements are also being considered.

It important to note that all the changes discussed in this article are only under consideration. There are still other parts of the revision process that must be fulfilled until such changes become part of the next edition of NFPA 1971.

Soon, the first draft revision will open for public comment and stay open until May 16, 2016. In the meantime, we are interested in your views of possible problems and issues with current turnout clothing and have established a [short online survey](#) to get your feedback.


## 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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