

Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents

2018



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NFPA® 1994

Standard on

Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents

2018 Edition

This edition of NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, was prepared by the Technical Committee on Hazardous Materials Protective Clothing and Equipment and released by the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on August 1, 2017, with an effective date of August 21, 2017, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at www.nfpa.org for more information.

This edition of NFPA 1994 was approved as an American National Standard on August 21, 2017.

Origin and Development of NFPA 1994

The Technical Committee on Hazardous Materials Protective Clothing and Equipment began work on this document in 1998 to answer the need for personal protective equipment (PPE) for fire and emergency services personnel operating at domestic terrorism incidents involving dual use industrial chemicals, chemical terrorism agents, or biological terrorism agents.

The committee developed this new standard, NFPA 1994, *Standard on Protective Ensembles for Chemical/Biological Terrorism Incidents*, to provide three levels of protective ensembles — Class 1, Class 2, and Class 3 ensembles — that could be selected for protection of fire and emergency services personnel based on what the incident risk analysis indicated is necessary protection for the intended operations.

The goal of this standard is to establish personal protection requirements for ensembles that would be available in quantity, pristine condition, designed for single exposure use, and easily donned and used by fire and emergency services personnel to reduce the safety risks and health risks to personnel during assessment, extrication, rescue, triage, and treatment operations at or involving chemical or biological terrorism incidents.

The jurisdiction of this committee does not include respiratory protection that is necessary for these operations; the appropriate respiratory protection needs to be addressed by the emergency responder organizations.

The first (2001) edition was acted on by the NFPA membership at the Annual Meeting in Anaheim, California, on May 16, 2001.

The 2007 edition was a complete revision. The title of the document was changed to *Protective Ensembles for First Responders to CBRN Terrorism Incidents.* The former requirements for Class 1 CBRN ensembles, for protection from chemical, biological, and radiological terrorism agents, were incorporated into NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*, 2005 edition, and were then incorporated into the base requirements for all vapor-protective ensembles. For the 2007 and 2012 editions, NFPA 1994 no longer specified a Class 1 ensemble but left the designation "Class 1" vacant. A new Class 4 ensemble was added to provide particulate protection for emergency responders to incidents where no chemical agent is identified but a particulate threat is present (including "white powder" incidents).

The CBRN protection requirements were developed to apply to all emergency first responders at hazardous materials and CBRN incidents. Individual agencies (law enforcement, emergency medical, medical first receivers, fire, and hazardous materials) need to define the operations for which their

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personnel are trained and develop detailed purchase specifications to ensure their ensembles best support their operational needs while providing CBRN protection.

In the 2007 edition, the committee also included new requirements in Chapter 4 for manufacturers' quality assurance programs and for situations in which hazards involving compliant products are believed to exist, including the appropriate actions in addressing these situations if there is a previously unknown threat to the users. These requirements apply to all emergency services product standards that are the responsibility of this project. All labeling, design, performance, and testing requirements were reviewed and refined as necessary.

The 2007 edition was presented to the Association membership at the 2006 Association meeting in Orlando, Florida on June 7, 2006, and issued by the Standards Council with an effective date of August 17, 2006.

The 2012 edition was extensively revised and included an updated permeation resistance test method with associated criteria for toxic industrial chemicals based on the cumulative permeation mass in one hour rather than breakthrough time; several new definitions; updates to several ANSI, ISO/IEC, and ASTM standards; and editorial, numbering, and formatting changes. The slip resistance test was revised based on new information that was proposed during the revision process related to the requirements necessary for evaluating the entire footwear sole. Additionally, the section on a Manufacturers' Quality Assurance Program was revised, and the Puncture Resistance Test 2 and the Impact and Compression Resistance Test were deleted from the standard and replaced with a design requirement that the footwear meet an ASTM specification for puncture and impact-resistant footwear.

The 2018 edition modifies the scope and title of the standard to include both hazardous materials and CBRN to minimize confusion as to the applicability of the standard for incidents that are not terrorism in nature. In addition, Class 1 ensemble requirements have been re-established within the standard, thereby reversing the decision to remove them in 2007. The Class 1 criteria parallel those in the 2016 edition of NFPA 1991 but provide practical criteria for both material barrier performance and overall design that result in a more form-fitting and tactical-based product. Ruggedized categories of certification (Type R) have been added for Classes 2, 3, and 4 to address the increasing use of the garments in harsher environments, such as urban search and rescue and law enforcement applications. These criteria involve more rigorous preconditioning of ensemble material prior to material barrier testing and ensemble integrity evaluations and higher levels of material physical property performance. Based upon recent research published by the U.S. Department of Defense, the chemical challenges have been modified to represent the vast diversity of chemicals found in the global chemical industry and to cover the breadth of fundamental chemical reactivity principles. Material breathability as measured by evaporative resistance and total heat loss has been addressed by reporting results for Class 2 and Class 2R ensembles and applying specific requirements for Class 3/3R and Class 4/4R ensembles. Footwear options have been broadened to allow for more flexibility when a chemical protective sock is used in coordination with the boot. Specific criteria have been developed to address separate hoods and elastomeric gasket materials. Optional criteria have been added for flash fire protection for all ensemble levels with a minimum level of flame resistance established for Class 1 ensembles. Finally, new stealth optional indicators for audible signatures and color have been added to address tactical operator concerns. Many other test methods have been modified for consistency following interlaboratory and intralaboratory validation efforts.

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Committee Scope: This Committee shall have primary responsibility for documents on protective clothing and protective equipment, except respiratory protective equipment, that provides hand, foot, torso, limb, and head protection for fire fighters and other emergency services responders during incidents that involve hazardous materials operations. These operations involve the activities of rescue; hazardous material confinement, containment, and mitigation; and property conservation where exposure to substances that present an unusual danger to responders are present or could occur due to toxicity, chemical reactivity, decomposition, corrosiveness, or similar reactions. Additionally, this Committee shall have primary responsibility for documents on the selection, care, and maintenance of hazardous materials protective clothing and protective equipment by fire and emergency services organizations and personnel.

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