NFPA Correlating Committee on Fire and Emergency Services
Protective Clothing and Equipment (FAE-AAC)
Meeting Agenda

March 1st, 2021
Virtual teams meeting
Time: 11:00am Eastern Time

1. Call to order: Chairman Rick Swan
2. Introduction of members and guests
3. Chairman remarks: Rick Swan
4. Review and approve minutes of previous meeting
5. NFPA staff liaison report
6. Technical Committee Second Draft Reports:
    - NFPA 2500
    - NFPA 1990
    - NFPA 1891
7. Old business
8. New business
    - Consolidation strategies for NFPA 1970
    - Webinar March 3rd, 11am – 2pm
9. Next meeting

NFPA Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment (FAE-AAC)

NFPA 1987 First Draft

Meeting minutes

January 26th, 2021
Virtual Teams Meeting
Time: 11:00am Eastern Time

1. Called to order by Chairman Rick Swan
    a. Attendance

Jason	Allen
Bob	Athanas
Roger	Barker
Christine	Fargo
Diane	Hess
Tricia	Hock
Beth	Lancaster
Karen	Lehtonen
David	Matthews
Ben	Mauti
Michael	McKenna
Steve	Miles
Brian	Montgomery
Judge	Morgan
John	Morris
Amanda	Newsom
Stephen	Sanders
Marni	Schmid
Rick	Swan
Jonathan	Szalajda

Don B	Thompson
Robert	Tutterow
Bruce	Varner
Harry	Winer
Chris	Farrell (NFPA)

2. Chairman remarks: Rick Swan
3. Reviewed and approved minutes of previous meeting
4. NFPA staff liaison report: Chris Farrell
5. Technical Committee NFPA 1987 First Draft Report
    a. No second correlating revisions created
6. Old business
    a. None
7. New business
    a. Project wide webinar planning continuing. Look for link invite via email.
8. Next meeting: March 1st, 2021

Address List No Phone

01/20/2021
Chris Farrell
FAE-AAC

Fire and Emergency Services Protective Clothing and Equipment

Rick L. Swan L 11/14/2006
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Edmund Farley E 08/03/2016
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Beth C. Lancaster E 08/17/2017
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Principal: Cristine Z. Fargo

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Principal: Douglas Menard

Pamela A. Kavalesky RT 10/28/2008
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Intertek Testing Services
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Principal: Jason L. Allen

Judge W. Morgan M 04/08/2015
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Jeffrey Peterson E 12/02/2020
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Principal: Bruce H. Varner

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Principal: Jeffrey O. Stull

Donald B. Thompson — **SE** 3/15/2007
Alternate — **FAE-AAC**
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Principal: Roger L. Barker

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Principal: Diane B. Hess

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TC on Electronic Safety Equipment

Christina M. Baxter — **U** 10/20/2010
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Nonvoting Member — **FAE-AAC**
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TC on Respiratory Protection Equipment

Brian Montgomery — **E** 03/07/2013
Nonvoting Member — **FAE-AAC**
US Department of Justice
National Institute of Justice
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Washington, DC 20531
Tactical and Technical Operations Respiratory Protection Equipment

Tim W. Tomlinson **C** 10/29/2012
Nonvoting Member **FAE-AAC**
Addison Fire Department
Gear Cleaning Solutions, LLC
2221 Manana Drive, Suite 190
Dallas, TX 75220-7118

Chris Farrell 03/26/2015
Staff Liaison **FAE-AAC**
National Fire Protection Association
One Batterymarch Park
Quincy, MA 02169-7471

M E M O R A N D U M

TO: Technical Committee on Technical Search and Rescue

FROM: Elena Carroll, *Sr. Committee Administrator*

DATE: February 17, 2021

SUBJECT: NFPA 2500 Second Draft Technical Committee FINAL Ballot Results (CustA2021)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

33 **Members Eligible to Vote**
5 **Members Not Returned** *(Emsley, Geraghty, Hernandez, McCallum, Speier)*

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 130-NFPA 2500-2020 [Section No. 4.2.5]

4.2.5

It is not the intent of this document ~~to have~~ that an organization shall deem itself capable of an advanced skill level in any of the disciplines defined herein simply by training or adhering to the requirements set forth.

4.2.6*

Maintaining an operations- or technician-level capability in any discipline shall require a combination of study, training, skill, and frequency of operations in that discipline.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Tue Nov 10 15:25:59 EST 2020

Committee Statement

Committee Statement: These changes were made in order to comply with the MOS, one requirement per statement, and to also ensure the related annex material is aligned with the correct section of text by moving the annex material from the current 4.2.5 to what will be the new 4.2.6.

Response Message: SR-130-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

The change is consistent with the intent of the document.

Second Revision No. 161-NFPA 2500-2020 [Section No. 4.2.14]

4.2.15*

The AHJ shall train responsible personnel in procedures for invoking, accessing, and using relevant components of the *National Search and Rescue Plan of the United States*, the "FEMA National Response Framework," and other national, state, and local response plans, as applicable.

A.4.2.15

Personnel involved in search and rescue (SAR) in the United States, and in other countries that have adopted its use, should also familiarize themselves with the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* and the *~~U.S.~~ United States National Search and Rescue Supplement* (NSS) *to the IAMSAR* (soon to be renamed the *National SAR Manual*).

The *IAMSAR Manual* is a three-volume set of reference materials jointly published by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). It was intended for use by all countries and provides implementation guidance for the *~~U.S~~. National Search and Rescue Plan for the United States* (2007).

The NSS, prepared under the direction of the National Search and Rescue Committee (NSARC), provides guidance to federal agencies concerning implementation of the National Search and Rescue Plan. The NSS provides specific additional national standards and guidance that build upon the baseline established in the *IAMSAR Manual* and provides guidance to all federal forces, military and civilian, that support civil search and rescue operations.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:50:40 EST 2020

Committee Statement

Committee Statement: These changes were editorial in nature and to align with chapter 2 and Annex L.

Response Message: SR-161-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments

0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Editorially a good change.

Second Revision No. 143-NFPA 2500-2020 [Section No. 7.2.2]

7.2.2

The organization shall have an appropriate number of personnel meeting the requirements of Chapter 4 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:21:58 EST 2020

Committee Statement

Committee Statement: This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.

Response Message: SR-143-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

This change is necessary for accuracy.

Second Revision No. 144-NFPA 2500-2020 [Section No. 8.2.2]

8.2.2

All members of the organization shall meet the requirements specified in Chapter 4 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:26:19 EST 2020

Committee Statement

Committee Statement: This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.

Response Message: SR-144-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 145-NFPA 2500-2020 [Section No. 8.3.2]

8.3.2

All members of the organization shall meet the requirements of ~~Chapter 5~~ Chapter 6 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:26:45 EST 2020

Committee Statement

Committee Statement: This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.

Response Message: SR-145-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 124-NFPA 2500-2020 [Section No. 9.4.5]

9.4.5

Organizations operating at the technician level for animal rescue incidents shall develop and implement procedures, commensurate with the identified needs of the organization, for the following:

(1) Using a tested harness device designed for animals and extended use in the high-angle environment ~~to include helicopter rescue~~

(2) Performing a high-angle rescue of an animal stranded on a structure or landscape feature

(3)* Negotiating an obstacle or projection along a horizontal path with an animal packaged in a litter or sling system

(4) Applying the principles of the physics involved in constructing rope rescue systems, including system safety factors, critical angles, and the causes and effects of force multipliers

(5)* Using high-angle rescue techniques to negotiate obstacles or otherwise manipulate the position of an animal packaged in an animal litter or sling system

(6) Moving an animal packaged in a litter or sling system up and over an edge during a raising or vertical lift operation with a rope system

(7) Mitigating dynamic loads associated with animal behaviors in a rope rescue system

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 09 10:32:01 EST 2020

Committee Statement

Committee Statement: Mention of helicopters has been stricken elsewhere in animal technical rescue standards, and the verbiage is not necessary to maintain the integrity of this point.

Response Message: SR-124-NFPA 2500-2020

Public Comment No. 2-NFPA 2500-2020 [Section No. 9.4.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

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Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Negative with Comment

McCurley, Loui

No reason for deletion given, other than "it doesnt exist elsewhere". Thats not justification. If all your friends jumped off a cliff, would you...

Second Revision No. 146-NFPA 2500-2020 [Section No. 11.2.2]

11.2.2

Each member of the organization shall meet the requirements specified in Chapter 4 of ~~NFPA 472~~ NFPA 470 and shall be a competent person as defined in 3.3.34.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:36:24 EST 2020

Committee Statement

Committee Statement:	This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.
Response Message:	SR-146-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 152-NFPA 2500-2020 [Section No. 11.2.3]

11.2.3

Organizations operating at the awareness level at trench and excavation emergencies shall implement procedures for the following:

(1) Initiating size-up to ascertain immediate response needs for a trench rescue

(2) Recognizing the need for technical resources

(3)* Identifying the resources necessary to conduct safe and effective trench and excavation emergency operations

(4)* Initiating the emergency response system for trenches and excavations

(5)* Initiating site control and scene management

(6)* Recognizing general hazards associated with trench and excavation emergency incidents and the procedures necessary to mitigate these hazards within the general rescue area

(7)* Recognizing typical trench and excavation collapse patterns, the reasons trenches and excavations collapse, and the potential for secondary collapse

(8)* Initiating a rapid, nonentry extrication of noninjured or minimally injured victim(s)

(9)* Recognizing the unique hazards associated with the weight of soil and its associated entrapping characteristics

(10) Implementing a hazard identification and isolation plan, including securing hazardous equipment, contacting utility location services, establishing control of affected utilities, and using methods for protecting bystanders and rescuers from accidentally falling into the excavation or increasing the likelihood of additional collapse

(11*) Identifying and implementing methods for approaching and working around the excavation in a manner that minimizes the potential of collapse resulting from additional imposed loads on the lip of the trench

A.11.2.3(11)

The primary method of risk management at this level is always to reduce the number of responders who approach the trench to only those necessary to perform the required tasks of assessing conditions in the excavation, locating a potential victim, and making any provisions to support immediate self-rescue or nonentry rescue. Other methods could include a path of approach that minimizes additional imposed load, which is typically from the end of the trench, and the use of load distribution and transfer techniques. Load transfer and distribution techniques might include the use of bridging, which uses ground ladders or lumber laid on the ground across the trench or along the edge to distribute the weight of responders and equipment across as wide an area and as far back from the lip as possible.

(12) Supporting an organization at the operations or technician level while functioning within an IMS

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 16 12:31:37 EST 2020

Committee Statement

Committee Statement: The committee is adding this new text as the current language provides for the completions of a task without guidance on how it might be accomplished. This annex material assists the reader with the intent on how it might be done.

Response Message: SR-152-NFPA 2500-2020

Public Comment No. 112-NFPA 2500-2020 [Section No. 11.2.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto
Cooper, Donald C.
Dennis, John
Doughty, Paul A.
English, Leslie D.
Esades, Deano G.
Gannon, Joseph P. (Pete)
Grootendorst, Eric
Hodges, Bruce
Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Appropriate to intent

Second Revision No. 147-NFPA 2500-2020 [Section No. 11.3.2]

11.3.2

Each member of the organization shall meet the requirements specified in Chapter 4 of ~~NFPA 472~~ NFPA 470 .

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:36:53 EST 2020

Committee Statement

Committee Statement:	This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.
Response Message:	SR-147-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 148-NFPA 2500-2020 [Section No. 12.2.2]

12.2.2

All members of the organization shall meet the requirements specified in Chapter 4 of ~~NFPA 472~~ 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:37:24 EST 2020

Committee Statement

Committee Statement: This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.

Response Message: SR-148-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 149-NFPA 2500-2020 [Section No. 12.3.2]

12.3.2

All members of the organization shall meet the requirements of Chapter ~~5~~ 6 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:37:49 EST 2020

Committee Statement

Committee Statement: This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.

Response Message: SR-149-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 150-NFPA 2500-2020 [Section No. 12.4.2]

12.4.2

All members of the organization shall meet the requirements of Chapter ~~5~~ 6 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:38:18 EST 2020

Committee Statement

Committee Statement:	This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.
Response Message:	SR-150-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 125-NFPA 2500-2020 [Section No. 13.2.4]

~~13.2.4~~

~~Each member of the cave rescue organization at the awareness level shall train to a minimum of Orientation to Cave Rescue as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.~~

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 09 10:47:56 EST 2020

Committee Statement

Committee Statement: As this is an organizational standard, 13.2.4 should not discuss what each member should be trained to. As such, it should be struck from the requirements. If this line is to remain, however, it should not reference a 3rd party's standard or equivalent without explicitly listing the requirements in the standard. All the other rescue disciplines list what is required in their standard and make the training requirements clear. As written, this line allows the 3rd party to change standards any time they wish without review.

Response Message: SR-125-NFPA 2500-2020

Public Comment No. 113-NFPA 2500-2020 [Section No. 13.2.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Negative with Comment

McCurley, Loui

NFPA regularly references other standards in product testing, etc. This is no different.

Second Revision No. 126-NFPA 2500-2020 [Section No. 13.3.4]

~~**13.3.4**~~

~~Each member of the cave rescue organization at the operational level shall train to a minimum of Level 2 Cave Rescuer as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.~~

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 09 10:51:51 EST 2020

Committee Statement

Committee Statement: As this is an organizational standard, 13.3.4 should not discuss what each member should be trained to. As such, it should be struck from the requirements. If this line is to remain, however, it should not reference a 3rd party's standard or equivalent without explicitly listing the requirements in the standard. All the other rescue disciplines list what is required in their standard and make the training requirements clear. As written, this line allows the 3rd party to change standards any time they wish without review.

Response Message: SR-126-NFPA 2500-2020

Public Comment No. 114-NFPA 2500-2020 [Section No. 13.3.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Negative with Comment

McCurley, Loui

NFPA regularly references other standards in product testing, etc. This is no different.

Second Revision No. 131-NFPA 2500-2020 [Section No. 13.4.2]

13.4.2

Organizations operating at the technician level at cave search and rescue incidents shall be capable of operating in environments in which special cave search and rescue training and equipment are required or where the capabilities of operations-level equipment and training are exceeded.

13.4.3

Technician-level response capability shall be required where any of the following are true:

(1) Where cave passage involves difficult scrambling or climbing

(2) Where water obstacles deeper than 2 ft (0.61 m) are present

(3) Where search and/or rescue involves technical cave passage that is difficult to negotiate without special skills or that might be exposed or dangerous

(4) Where cave passage is tight and might require squeezing through constricted spaces

(5) Where travel or transport might involve fragile cave environments

(6) Where the incident might span more than one operational period of 8 hours

(7) Where specialized route-finding skills are required, or the use of cave maps is required

(8) Where travel or patient evacuation requires negotiating steep to vertical slopes where rope is essential for security or suspension

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Tue Nov 10 15:27:10 EST 2020

Committee Statement

Committee Statement: This change is being made in order to comply with the MOS, one requirement/sentence per section, and is being broken out into two sections. There are no changes being made to the text or the individual requirements.

Response Message: SR-131-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

More readable, too..

Second Revision No. 127-NFPA 2500-2020 [Section No. 13.4.6]

~~13.4.7~~

~~Each member of the cave rescue organization at the technical level shall train to a minimum of Level 3 Cave Rescuer as defined by the National Cave Rescue Commission of the National Speleological Society or equivalent.~~

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 09 10:54:08 EST 2020

Committee Statement

Committee Statement: As this is an organizational standard, 13.4.6 should not discuss what each member should be trained to. As such, it should be struck from the requirements. If this line is to remain, however, it should not reference a 3rd party's standard or equivalent without explicitly listing the requirements in the standard. All the other rescue disciplines list what is required in their standard and make the training requirements clear. As written, this line allows the 3rd party to change standards any time they wish without review.

Response Message: SR-127-NFPA 2500-2020

Public Comment No. 115-NFPA 2500-2020 [Section No. 13.4.6]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Negative with Comment

McCurley, Loui

NFPA regularly references other standards in product testing, etc. This is no different.

Second Revision No. 151-NFPA 2500-2020 [Section No. 14.2.2]

14.2.2

All members of the organization shall meet the requirements of Chapter 4 of ~~NFPA 472~~ NFPA 470 commensurate with the organization's needs.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Fri Nov 13 10:39:03 EST 2020

Committee Statement

Committee Statement:	This change was made in order to reflect the consolidation of NFPA 472 into NFPA 470 as part of the consolidation plan.
Response Message:	SR-151-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 128-NFPA 2500-2020 [Section No. 17.4.3]

17.4.3

Organizations operating at the technician level at swiftwater search and rescue incidents shall have the following capabilities:

(1) Constructing and operating rope rescue system anchors and mechanical advantage systems as specified by the AHJ

(2) Constructing a tension diagonal rope system over water

(3) Constructing a highline system over water

(4) Constructing and operating rope systems that position and move a tethered boat controlled by ropes

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 09 10:55:52 EST 2020

Committee Statement

Committee Statement: Consistency of writing, unless we are thinking that teams will be building tension diagonals over dry land. . .

Response Message: SR-128-NFPA 2500-2020

Public Comment No. 111-NFPA 2500-2020 [Section No. 17.4.3]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

The recommendation adds to consistency and supports the intent of the statement/section.

Second Revision No. 132-NFPA 2500-2020 [Section No. 23.2.3 [Excluding any Sub-Sections]]

The AHJ shall ensure that each member of the tower rescue organization is aware of the hazards that could be confronted when called upon to perform rescue in or on towers within the response area of the AHJ, including (but not limited to) radio frequency ~~RF~~.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Tue Nov 10 15:28:13 EST 2020

Committee Statement

Committee Statement:	This change was editorial in nature as this is the first occurrence where RF is used or called out, so it should be spelled out.
Response Message:	SR-132-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Repairs an oversight.

Second Revision No. 154-NFPA 2500-2020 [Section No. A.4.5.1.1]

A.4.5.1.1

Specific specialized equipment that might be required for safe technical rescue operations includes the following:

(1) Supplied line breathing apparatus (SLBA), supplied air breathing apparatus (SABA), and supplied air respirator (SAR), all of which should meet the requirements of 29 CFR 1910.146, “Permit-Required Confined Spaces”

(2) Personal alert safety system (PASS), which should meet the requirements of NFPA 1500 and NFPA 1982

(3) Life safety ropes and system components, which should meet the requirements of NFPA 1500~~,~~ and the applicable requirements of ~~NFPA 1983~~ NFPA 2500

(4) Communications equipment, which should meet the requirements of 29 CFR 1910.146

(5) Lighting equipment (e.g., flashlights, helmet-mounted lamps), which should be, depending on the situation, intrinsically safe or explosion proof as defined by 29 CFR 1910.146, and should be evaluated by the AHJ as to the appropriateness of the equipment at an emergency incident with regard to the existing hazards

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:17:02 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference of NFPA 1983 as that document has been consolidated into this document, NFPA 2500.

Response Message: SR-154-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Negative with Comment

McCurley, Loui

Suggest that we reference BOTH 1983 and 2500 here, at least for this edition (until people get trained!)

Second Revision No. 155-NFPA 2500-2020 [Section No. A.7.2.4(3)]

A.7.2.4(3)

Hazards can include, but are not limited to, the following:

(1) Hazardous atmospheres

(2) Hazardous chemicals

(3) Temperature extremes

Some methods of recognition and assessment of hazards associated with confined spaces include, but are not limited to, the following:

(1) Assessment of the perimeter surrounding the confined space incident to determine the presence of or potential for a hazardous condition that could pose a risk to rescuers during approach

(2) Recognition of the need for decontamination of a patient or responder who might have been exposed to a hazardous material as per ~~NFPA 472 , NFPA 473 ,~~ NFPA 470 and OSHA regulations in 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response” (HAZWOPER)

(3) Recognition of the need for a confined space rescue service or additional resources when nonentry retrieval is not possible

(4) Notification of the designated rescue service and other resources necessary for initiation of confined space rescue

(5) Recognition of hazardous atmospheres or materials through visual assessment and information received from on-site personnel

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:20:21 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 472 and NFPA 473 to NFPA 470 as NFPA 472 and NFPA 473 are now consolidated into NFPA 470.

Response Message: SR-155-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto
Cooper, Donald C.
Dennis, John
Doughty, Paul A.
English, Leslie D.
Esades, Deano G.
Gannon, Joseph P. (Pete)
Grootendorst, Eric
Hodges, Bruce
Holowczynsky, Ihor M.
Kohan, Jonathan B.
Kovacs, Timothy A.
Legrow, Colin
Mate, Glenn E.
McKently, John
McNemar, Ralph
O'Connell, John P.
Phillips, Brandi K.
Rickenbach, Eric J.
Schecter, Peter M.
Spires, Dustin
Waller, Ben
Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 156-NFPA 2500-2020 [Section No. A.7.3.7(5)]

A.7.3.7(5)

Personnel meeting the requirements of ~~NFPA 472~~ NFPA 470 should perform the monitoring procedures even if such personnel are not part of the rescue team. Monitoring the atmosphere can include the following considerations:

(1) Acceptable limits for oxygen concentration in air should be between 19.5 percent and 23.5 percent. An oxygen-enriched atmosphere is considered to be greater than 23.5 percent and poses a flammability hazard. An oxygen-deficient atmosphere is considered to be lower than 19.5 percent and can lead to asphyxiation without fresh-air breathing apparatus.

(2) Flammability is measured as a percentage of a material's lower explosive limit (LEL) or lower flammable limit (LFL). Rescuers should not enter confined spaces containing atmospheres greater than 10 percent of a material's LEL regardless of the PPE worn. There is no adequate protection for an explosion within a confined space.

(3) Acceptable toxicity levels are specific to the hazardous material involved, and chemical properties should be assessed to determine the level of the hazard for a given environment and time frame.

The confined space rescue team at the operations level should have available resources capable of understanding the assessment tools necessary for analysis and identification of hazardous conditions within confined spaces and interpretation of that data. This capability should include at least the following:

(1) Identification of the hazards found within confined spaces and understanding how those hazards influence victim viability and rescue/recovery operations

(2) Selection and use of monitoring equipment to assess the following hazards:

  (a) Oxygen-deficient atmospheres

  (b) Oxygen-enriched atmospheres

  (c) Flammable environments

  (d) Toxic exposures

  (e) Radioactive exposures

  (f) Corrosive exposures

(3) Understanding of the limiting factors associated with the selection and use of the atmospheric and chemical monitoring equipment provided by the AHJ for confined space emergencies. The factors determined by this equipment include, but are not limited to, calibration, proper operation, response time, detection range, relative response, sensitivity, selectivity, inherent safety, environmental conditions, and the nature of the hazard. This equipment could include, but is not limited to, the following:

  (a) Calorimetric tubes

  (b) Oxygen concentration monitor (continuous reading, remote sampling)

  (c) Combustible gas monitor (continuous reading, remote sampling)

  (d) Specific toxicity monitor (continuous reading, remote sampling)

  (e) Multigas atmospheric monitors (continuous reading, remote sampling)

  (f) Passive dosimeter

  (g) pH papers, pH meters, and pH strips

  (h) Radiation detection instruments

(4) Utilization and evaluation of reference terms and resources to include, but not be limited to, the following:

  (a) Lethal concentration-50 (LC-50)

  (b) Lethal dose-50 (LD-50)

(c) Permissible exposure limit (PEL)

(d) Threshold limit value (TLV)

(e) Threshold limit value — short-term exposure limit (TLV-STEL)

(f) Threshold limit value — time-weighted average (TLV-TWA)

(g) Immediately dangerous to life and health (IDLH)

(h) Chemical information documents (i.e., SDS)

(i) Reference manuals

(j) Computerized reference databases

(k) Technical information centers

(l) Technical information specialists

(m) Monitoring equipment

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:22:49 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 472 to NFPA 470 as NFPA 472 is now consolidated into NFPA 470.

Response Message: SR-156-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

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Gannon, Joseph P. (Pete)

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Holowczynsky, Ihor M.

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Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 162-NFPA 2500-2020 [Section No. A.10.4.2]

A.10.4.2

See *Mountain Rescue Association Policies,* “Policy ~~150~~ 105 : Personnel Guidelines.”

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:54:32 EST 2020

Committee Statement

Committee Statement: This change was to update to the correct title.

Response Message: SR-162-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

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Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

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O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 157-NFPA 2500-2020 [Section No. A.11.3.4(20)]

A.11.3.4(20)

Procedures for disentanglement and removing the entrapment mechanism can include, but are not limited to, the following:

(1) Hand digging

(2) Lifting using air bags, pneumatic, or other mechanical advantage devices

(3) Suctioning

(4) Cutting using air knives, saws, or other power tools

(5) Dewatering

(6) Use of heavy equipment

Procedures and equipment involved in removal systems should comply with ~~NFPA 1983~~ the applicable portions of this standard .

Heavy or mechanical equipment and/or mechanical winches of any kind should not be used to physically lift, pull, or extricate victims from a trench. However, there can be circumstances when heavy equipment can be appropriate for accessing victims of trench and evacuation emergencies with the appropriate level of supervision and after careful consideration is given to the negative impact of such actions on the victim, including the effects of extreme superimposed loads and vibration adjacent to the trench. For example, heavy equipment might be used to dig an adjacent trench or hole for access, but the excessive loading and vibration of the area adjacent to the trench can cause a rapid deterioration in the condition of, and in the immediate environment surrounding, the victim. In any case, to best establish viable options and available capabilities, the advice of experienced and knowledgeable on-site personnel should be sought in order to make the best possible decisions.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:25:01 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 1983 to this standard (NFPA 2500) as NFPA 1983 is now consolidated into this standard (NFPA 2500).

Response Message: SR-157-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All

1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.
Bryant, Roger E.
Burrero, Alberto
Cooper, Donald C.
Dennis, John
Doughty, Paul A.
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Esades, Deano G.
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Mate, Glenn E.
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McNemar, Ralph
O'Connell, John P.
Phillips, Brandi K.
Rickenbach, Eric J.
Schecter, Peter M.
Spires, Dustin
Waller, Ben
Wright, Richard

Affirmative with Comment

McCurley, Loui

Much better approach...

Second Revision No. 158-NFPA 2500-2020 [Section No. A.11.4.3(10)]

A.11.4.3(10)

Personnel meeting the requirements of ~~NFPA 472~~ NFPA 470 should perform the monitoring procedures even if such personnel are not part of the rescue team. Important information regarding these procedures include, but are not limited to, the following:

(1) Acceptable limits for oxygen concentration in air should be between 19.5 percent and 23.5 percent. An oxygen-enriched atmosphere is considered to be greater than 23.5 percent and poses a flammability hazard. An oxygen-deficient atmosphere is considered to be lower than 19.5 percent and can lead to asphyxiation without fresh-air breathing apparatus.

(2) Flammability is measured as a percentage of a material's lower explosive limit (LEL) or lower flammable limit (LFL). Rescuers should not enter confined spaces containing atmospheres greater than 10 percent of a material's LEL regardless of the PPE worn. There is no adequate protection for an explosion within a confined space.

(3) Acceptable toxicity levels are specific to the hazardous material involved, and chemical properties should be assessed to determine the level of the hazard for a given environment and time frame.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:27:05 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 472 to NFPA 470 as NFPA 472 is now consolidated into NFPA 470.

Response Message: SR-158-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 159-NFPA 2500-2020 [Section No. A.14.2.3(3)]

A.14.2.3(3)

Hazards can include, but are not limited to, the following:

(1) Hazardous atmospheres

(2) Hazardous chemicals

(3) Temperature extremes

(4) Fall hazards

(5) Moving equipment

Some methods of recognition and assessment of hazards associated with mines and tunnels include, but are not limited to, the following:

(1) Assessment of the perimeter surrounding the mine or tunnel incident to determine the presence of or potential for a hazardous condition that could pose a risk to rescuers during approach

(2) Recognition of the need for decontamination of a patient or responder who might have been exposed to a hazardous material as per Chapter ~~11~~ 18 of ~~NFPA 472~~ NFPA 470 and OSHA regulations in 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response” (HAZWOPER)

(3) Recognition of the need for a search and rescue organization or additional resources

(4) Notification of the designated search and rescue organization and other resources necessary for initiation of mine or tunnel rescue

(5) Recognition of hazardous atmospheres or materials through visual assessment and information received from on-site personnel

(6) Recognition of potential fall hazards in and around the site

(7) Recognition of potential hazards associated with open excavations in and around the site

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:30:48 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 472 to NFPA 470 as NFPA 472 is now consolidated into NFPA 470.

Response Message: SR-159-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 160-NFPA 2500-2020 [Section No. A.18.4.7(14)]

A.18.4.7(14)

See ~~Chapter 11 of NFPA 472 and NFPA 473~~ Chapter 18 of NFPA 470 for pre-entry and postentry monitoring. An abbreviated exam in rescue mode can consist of oral history only (e.g., level of consciousness, recent illness, injury, or medication; recent alcohol ingestion; problems incompatible with equalizing). This exam can be accomplished as the diver is dressing.

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:35:21 EST 2020

Committee Statement

Committee Statement: This change was made due to the ERRS consolidation plan and to update the cross-reference to NFPA 470.

Response Message: SR-160-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony
Geraghty, Stephen J.
Hernandez, Hector
McCallum, Jay
Speier, Andrew

Affirmative All

Bassler, George A.
Brads, Jamey B.
Brennan, Francis J.

Bryant, Roger E.

Burrero, Alberto

Cooper, Donald C.

Dennis, John

Doughty, Paul A.

English, Leslie D.

Esades, Deano G.

Gannon, Joseph P. (Pete)

Grootendorst, Eric

Hodges, Bruce

Holowczynsky, Ihor M.

Kohan, Jonathan B.

Kovacs, Timothy A.

Legrow, Colin

Mate, Glenn E.

McKently, John

McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 163-NFPA 2500-2020 [Section No. E.2]

E.2 Four Categories of Building Construction.

The construction categories, types, and occupancy usage of various structures might necessitate the utilization of a variety of different techniques and material. The four construction categories that the rescuer most likely will encounter in collapse situations are light-frame, heavy wall, heavy floor, and precast concrete construction. The following four categories usually comprise the majority of structures affected by a collapse:

(1) *Light-Frame Construction.*

  (a) Materials used for light-frame construction are generally lightweight and provide a high degree of structural flexibility in response to forces such as earthquakes, hurricanes, tornados, and so forth.

  (b) These structures typically are constructed with skeletal structural frame systems of wood or light-gauge steel components that provide support to the floor and roof assemblies.

  (c) Examples of this construction type include wood frame structures used for residential, multiple low-rise, and light commercial occupancies up to four stories in height. Light-gauge steel frame buildings include commercial, business, and light manufacturing occupancies and facilities.

(2) *Heavy Wall Construction.*

  (a) Materials used for heavy wall construction are generally heavy and utilize an interdependent structural or monolithic system. These types of materials and their assemblies tend to produce a structural system that is inherently rigid.

  (b) This construction type usually is built without a skeletal structural frame. It utilizes a heavy wall support and assembly system that provides support for the floors and roof areas.

  (c) Occupancies utilizing tilt-up concrete construction are typically one to three stories in height and consist of multiple, monolithic concrete wall panel assemblies. They also use an interdependent girder, column, and beam system for providing lateral wall support of floor and roof assemblies. Such occupancies typically include commercial, mercantile, and industrial usage. Materials other than concrete now are being utilized in tilt-up construction.

  (d) Examples of this type of construction include reinforced and unreinforced masonry buildings typically of low-rise construction, one to six stories in height, and of any occupancy type.

(3) *Heavy Floor Construction.*

  (a) Structures of heavy floor construction are built utilizing cast-in-place concrete construction consisting of flat slab panel, waffle, or two-way concrete slab assemblies. Pretensioned or post-tensioned reinforcing steel rebar or cable systems are common components used for structural integrity. The vertical structural supports include integrated concrete columns, concrete-enclosed steel frame, or steel frame, which carry the load of all floor and roof assemblies. This type of structure includes heavy timber construction that might use steel rods for reinforcement.

  (b) The reinforcing steel, along with the varying thicknesses of concrete structural slab and girder supports utilized in this construction assembly, pose significant concerns with respect to breaching and void penetration.

  (c) The loss of reinforcement capability and the integrity of structural loading capacity of the floor and wall assemblies create significant safety and operational considerations during collapse operations.

  (d) Structural steel frame construction utilizes a skeletal framing system consisting of large-load-carrying girders, beams, and columns for structural support. These components represent a substantial weight factor for individual and assembly components. Floor systems consist of cast-in-place concrete slabs of varying thicknesses poured onto metal pan or structural metal floor decks and also might include precast and post-tensioned concrete plank systems. These concrete/metal pan floor assemblies are supported by the structural steel framing system.

(e) The exterior construction might consist of metal or masonry veneer, curtain wall, or composite material panel systems. Additionally, precast concrete or stoneclad panel systems might be present.

(f) Multiple assembly or component failures might be present in a collapse situation where isolated or multiple collapse conditions or collapse configurations exist.

(g) Examples of this type of construction include offices, schools, apartments, hospitals, parking structures, and multipurpose facilities. Heights vary from single-story to high-rise structures.

(4) *Precast Concrete Construction.*

(a) Structures of precast concrete construction are built utilizing modular precast concrete components that include floors, walls, columns, and other subcomponents that are field-connected at the site.

(b) Individual concrete components utilize imbedded steel reinforcing rods and welded wire mesh for structural integrity and might utilize either steel beam and column or concrete framing systems for the overall structural assembly and building enclosure.

(c) These structures rely on single- or multipoint connections for floor and wall enclosure assembly and are a safety and operational concern during collapse operations.

(d) Examples of this type of construction include commercial, mercantile, office, and multiuse or multifunction structures, including parking structures and large occupancy facilities.

Table E.2 lists the four model construction codes and standards commonly adopted within the United States and is provided to aid the AHJ in identifying the relationship of ~~NFPA 1670~~ NFPA 2500 (Chapters 4 through 23) construction/collapse types to their applicable code. These model codes are referenced to classification Types I through V as specified in NFPA 220.

Table E.2 Fire-Resistive Building Types

Reference	**Fire-Resistive[a]**		**Noncombustible[a]**			**Ordinary[1a]**		**Heavy Timber[a]**	**Wood[a]**	
NFPA 220[b,c]	Type I		Type II			Type III		Type IV	Type V	
	443	332	222	111	000	211	200	2HH	111	000
BOCA[d]	Type I		Type II			Type III		Type IV	Type V	
	1A	1B	2A	2B	2C	3A	3B	4	5A	5B
UBC[e]	Type I		Type II			Type III		Type IV	Type V	
	P		P	P	NP	P	NP		P	NP
SBC[f]	Type I	Type II	Type IV			Type V		Type III	Type VI	
	433	332	P	NP	P	NP	2HH	P	NP	

[a]The table headings for fire-resistive, noncombustible, ordinary, heavy timber, and wood construction do not represent any special construction code classification but are meant to provide an easily recognizable general construction type reference.

[b]See NFPA 220 for common definitions of construction Types I through V.

[c]The three-digit arabic numbers that appear beneath each construction type heading designate the fire resistance rating requirements for certain structural elements specified in NFPA 220. They are provided in this table as a reference and to indicate their relationship to each type of construction.

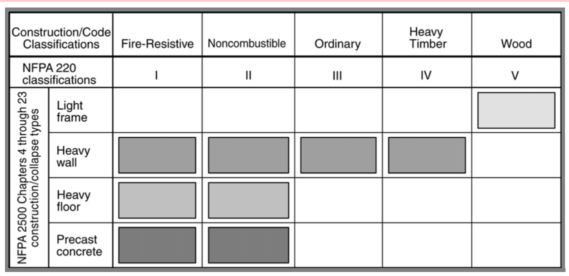
[d]Construction types are referenced to the BOCA *National Building Code* for correlation with fire-resistive rating requirements for each construction type.

[e]Construction types are referenced to UBC, *Uniform Building Code.* The designations P and NP stand for “protected” and “not protected,” respectively, as used within the UBC.

[f]Construction types are referenced to SBC, *Standard Building Code.* The designations P (protected) and NP (not protected) are used in order to provide correlation with *Uniform Building Code* information.

Figure E.2 is intended to identify construction/collapse types according to the classifications of NFPA 220 and is not part of any fire-resistive or fire rating/assembly requirement. In this table, the ~~NFPA 1670~~ NFPA 2500 (Chapters 4 through 23) construction/collapse types are referenced to NFPA 220 to allow rapid correlation of construction code classification with the associated construction/collapse type. Depending on occupancy, usage, and actual size of the structure, some construction code classifications can exhibit characteristics of other than specifically correlated construction/collapse types.

Figure E.2 Construction Code Classifications by Building Type.



Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 11:04:21 EST 2020

Committee Statement

Committee Statement: This change is being made due to the ERRS consolidation project and that NFPA 1670 is now consolidated into NFPA 2500 and to identify what chapters in NFPA 2500 are the content that was NFPA 1670. The change to Figure E.2 is to read as follows:

NFPA 2500 (chapters 4-23) construction/collapse types

Response Message: SR-163-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters

5 Not Returned

27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

Hernandez, Hector

McCallum, Jay

Speier, Andrew

Affirmative All

Bassler, George A.

Brads, Jamey B.

Brennan, Francis J.

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Kovacs, Timothy A.

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McNemar, Ralph

O'Connell, John P.

Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

Second Revision No. 153-NFPA 2500-2020 [Section No. G.4]

G.4 Confined Space Hazard Identification.

Procedures to perform a confined space hazard identification include, but are not limited to, the following:

(1) Identification of the important industrial documentation, where available, useful in hazard identification, including entry permits, lockout/tagout procedures and checklists, and hot work permits

(2) Selection of all applicable information necessary for emergency responders from chemical information documents (i.e., SDS)

(3) PPE for the hazard as per ~~NFPA 472~~ NFPA 470 and OSHA regulations in 29 CFR 1910.120, “Hazardous Waste Operations and Emergency Response” (HAZWOPER)

Submitter Information Verification

Committee: TEC-AAA

Submittal Date: Mon Nov 23 10:13:12 EST 2020

Committee Statement

Committee Statement:	This change was made due to the ERRS consolidation plan and to update the cross-reference from NFPA 472 to NFPA 470 as NFPA 472 is now consolidated into NFPA 470.
Response Message:	SR-153-NFPA 2500-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Emsley, Tony

Geraghty, Stephen J.

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Phillips, Brandi K.

Rickenbach, Eric J.

Schecter, Peter M.

Spires, Dustin

Waller, Ben

Wright, Richard

Affirmative with Comment

McCurley, Loui

Necessary for accuracy

MEMORANDUM

TO: Technical Committee on Special Operations Protective Clothing and Equipment

FROM: Yvonne Smith, *Committee Administrator*

DATE: February 17, 2021

SUBJECT: NFPA 2500 Second Draft Technical Committee FINAL Ballot Results (CustA2021)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

27 **Members Eligible to Vote**
4 **Members Not Returned** (*Allen, Dacey, Dunn, Mignogno*)

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 123-NFPA 2500-2020 [Global Comment]

Change title of standard to:

Standard for Operations and Training for Technical Rescue, and Life Safety Rope and Equipment for Emergency Services

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Oct 27 13:21:06 EDT 2020

Committee Statement

Committee Statement: Technical Committee changed to title to reflect the NFPA 1670 proposed title. 'Search and incidents' has been removed to condense the title.

Response Message: SR-123-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard
Garber, Richard
Hess, Diane B.
Howard, Thomas
Kesler, Richard
Legros, Stephen
Lehtonen, Karen E.
McCurley, Loui
McKently, John
Metz, Jeremy
Murray, James E.
Newsom, Amanda H.
Plunkett, Matthew Gerald
Rihn, John F.
Schoppa, Kimberly
Simmonds, Robert
Statham, Denise N.
Tarley, Jay L.

Second Revision No. 167-NFPA 2500-2020 [Global Comment]

Make the following change in all instances where this language appears in chapter 25, leaving any additional language in the section as is:

MEETS THE . . . REQUIREMENTS OF NFPA 1983, ~~STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES,~~ INCORPORATED IN THE 2022 EDITIONOF NFPA 2500 .

25.1.1.8, 25.2.1.8, 25.3.1.2, 25.4.1.8, 25.5.1.2, 25.6.1.8, 25.7.1.7, 25.8.1.7, 25.9.1.10, 25.9.1.11, 25.10.1.10, 25.10.1.11, 25.11.1.8, 25.12.1.10, 25.13.1.10, 25.14.1.2.1, 25.14.1.9, 25.15.1.2.1, 25.15.1.9, 25.16.1.2.1, 25.16.1.9, 25.17.1.2.1, 25.17.1.9, 25.18.1.2.1, 25.18.1.9, 25.19.1.2.1, 25.19.1.9, 25.20.1.2.1, 25.20.1.9, 25.21.1.2.1, 25.21.1.9, 25.22.1.2.1, 25.22.1.9, 25.23.1.2.1, 25.23.1.9, 25.24.1.2.1, 25.24.1.9, 25.25.1.2.2, 25.25.1.9.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 11:14:36 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-167-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
17 Affirmative All
2 Affirmative with Comments
4 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Howard, Thomas

Kesler, Richard

Legros, Stephen

Murray, James E.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Lehtonen, Karen E.

In the editorial review process, a change was made in several sections regarding the addition of “INCORPORATED IN THE 2022 EDITION OF NFPA 2500” after “MEETS NFPA 1983”. This change has unintended consequences for several hardware items covered in this standard where the space on the device is extremely limited and only allows for the original text of “MEETS NFPA 1983”. These sections are as follows: 25.14.1.2.1 Belay Devices 25.15.1.2.1 Carabiners and Snap Links 25.16.1.2.1 Descent Control Devices 25.17.1.2.1 Escape Anchors 25.18.1.2.1 Litters 25.19.1.2.1 Portable Anchors 25.20.1.2.1 Pulleys 25.21.1.2.1 Rope Grabs and Ascending Devices 25.22.1.2.1 Other Auxiliary Equipment 25.23.1.2.1 Escape Systems 25.24.1.2.1 Fire Escape Systems 25.25.1.2.2 Manufactured Systems Additionally, the language regarding the incorporation of NFPA 1983 in NFPA 2500 would be on the product label based on the editorial revision.

Metz, Jeremy

This labeling has the potential to not be practical for manufacturers to achieve.

Negative with Comment

Hess, Diane B.

It is seemingly impossible and impractical to attempt all this wording on small pieces of equipment. Wording needs be shortened to where it is practical to implement

McCurley, Loui

Too many words

McKently, John

I am very concerned about the ability to fit all of the new wording on hardware product pieces. It is not so much an issue with a harness with a sewn in tag but for an item such as a pulley or carabiner there just isn't enough space. I understand that this item was created as a global editorial change after the last committee meeting so that it wasn't a subject of discussion where these concerns would have been voiced. I suggest that the requirement be similar to what is in the current edition of the standard-Meets NFPA 1983 [or NFPA 2500 if that is preferred] (2022 Ed) Specific items where this should be removed are:25.14.1.2.1-Belay Devices,25.15.1.2.1-Carabiners, 25.16.1.2.1-Descent Control Devices, 25.17.1.2.1-Escape Anchors, 25.20.1.2.1-Pulleys, 25.1.2.1-Rope Grab and Ascending Devices, 25.22.1.2.1-Load Bearing Hardware, 25.23.1.2.1-Escape System Load Bearing

Components, 25.24.1.2.1-Fire Escape System Load Bearing Components and 25.25.1.2.1-Manufactured Systems. It could also apply to 25.18.1.2.1-Litters or 25.19.1.2.1 under some circumstances. This same global editorial change seems to radically alter the existing where the title of the standard is included in the labeling requirement. It seems to only be concerned with including 1983 in 2500. Which is it going to be? 1983 or 2500 and from that the full title of the standard should be included-"Meets the requirements of NFPA 2500 [or NFPA 1983 incorporated into the 2022 Edition of NFPA 2500] Standard For Operations and Training for Technical Rescue and Equipment for Emergency Services. Also editorial in 25.14.1.2.1 I believe the word "device" is missing. Suggest: "Each belay device shall have the following compliance statement."

Newsom, Amanda H.

This SR includes the labeling on the actual product label and the actual hardware pieces. Right now, hardware pieces, such as a pulley, for example, have to have the following statement on the actual hardware piece, “MEETS NFPA 1983 (2017 ED).” For the next edition, according to this SR, the pieces will instead have to include, “MEETS NFPA 1983, INCORPORATED IN THE 2022 EDITION OF NFPA 2500.” That’s too much additional verbiage for a hardware piece, especially when real estate is already tight. This will be an impossible task for most, if not all, pieces. The following should be removed from this requirement: 25.14.1.2.1, 25.15.1.2.1, 25.16.1.2.1, 25.17.1.2.1, 25.18.1.2.1, 25.19.1.2.1, 25.20.1.2.1. 25.21.1.2.1, 25.22.1.2.1, 25.23.1.2.1, 25.24.1.2.1, 25.25.1.2.1. The requirement for these products should be revised to, "MEETS NFPA 2500 (2022 ED)" or something similarly short. For the product labels, per this SR, the NFPA compliance statement is going from, from example, "MEETS THE FIRE ESCAPE ROPE REQUIREMENTS OF NFPA 1983, STANDARD ON LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES, 2017 EDITION" to "MEETS THE FIRE ESCAPE ROPE REQUIREMENTS OF NFPA 1983, INCORPORATED IN THE 2022 EDITION OF NFPA 2500." The title of the standard is being dropped. If the intent of including both standard numbers in the statement is to help with any confusion over the standard change, it seems like the title should be included to help even more, plus the title should be included regardless. The required NFPA compliance statement for 25.1.1.8, 25.2.1.8, 25.3.1.2, 25.4.1.8, 25.5.1.2, 25.6.1.8, 25.7.1.7, 25.8.1.7, 25.9.1.10, 25.9.1.11,25.10.1.10, 25.10.1.11, 25.11.1.8, 25.12.1.10, 25.13.1.10, 25.14.1.9, 25.15.1.9, 25.16.1.9, 25.17.1.9, 25.18.1.9, 25.19.1.9, 25.20.1.9, 25.21.1.9, 25.22.1.9, 25.23.1.9, 25.24.1.9, and 25.25.1.9 should be revised to, "MEETS THE ...REQUIREMENTS OF NFPA 1983, INCORPORATED IN THE 2022 EDITION OF NFPA 2500, STANDARD FOR OPERATIONS AND TRAINING FOR TECHNICAL RESCUE, AND LIFE SAFETY ROPE AND EQUIPMENT FOR EMERGENCY SERVICES."

Second Revision No. 168-NFPA 2500-2020 [Global Comment]

Make the following change in all instances where this language appears in chapter 25, leaving any additional language in the section as is:

MEETS REQUIREMENTS FOR ESCAPE ROPE OF NFPA 1983, INCORPORATED IN THE 2022 EDITION OF NFPA 2500 .

25.1.1.13, 25.2.1.12, 25.3.1.5, 25.4.1.12, 25.5.1.5, 25.6.1.12, 25.7.1.11.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 11:15:26 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-168-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
17 Affirmative All
2 Affirmative with Comments
4 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Howard, Thomas

Kesler, Richard

Legros, Stephen

Murray, James E.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Lehtonen, Karen E.

In the editorial review process, a change was made in several sections regarding the addition of “INCORPORATED IN THE 2022 EDITION OF 2500” after “MEETS REQUIREMENTS FOR XXX OF NFPA 1983”. This change has unintended consequences for ropes and the internal identification tape. The amount of information and how frequently it must be repeated over a specific length throughout the tape (which include NFPA as well as verbiage related to other standards). There are potential issues with being able to include the added text over the specified length. These sections are as follows: 25.1.1.13 Life Safety Rope 25.2.1.12 Escape Rope 25.3.1.5 Escape Webbing 25.4.1.12 Fire Escape Rope 25.5.1.5 Fire Escape Webbing 25.6.1.12 Throwline 25.7.1.11 Moderate Laid Life-Saving Rope Additionally, the language regarding the incorporation of NFPA 1983 in NFPA 2500 would be on the product label based on the editorial revision.

Metz, Jeremy

This has a potential for manufacturers to not be able to have this verbiage on internal identification tapes.

Negative with Comment

Hess, Diane B.

It is seemingly impossible and impractical to attempt all this wording on small pieces of equipment. Wording needs be shortened to where it is practical to implement

McCurley, Loui

Too many words.

McKently, John

Similar to my comments pm SR 167. I suggest that a decision be made as to whether it is going to be NFPA 1983 or NFPA 2500 and then adjust the requirement to include the full title of the document as is the current requirement. "Meets the requirements of NFPA 2500 [or NFPA 1983 incorporated into the 2022 Edition of NFPA 2500] Standard For Operations and Training for Technical Rescue and Equipment for Emergency Services.

Newsom, Amanda H.

This SR is regarding the internal identification tape that needs to be included in all ropes, as well as escape and fire escape webbing. This SR adds in the phrase, "INCORPORATED IN THE 2022 EDITION OF NFPA 2500." This is too much to go onto the internal identification tape. The verbiage required on the internal tape has to be printed on the tape at least every one meter which sounds like there should be room, but for those that include other information required for other standards, this could be a problem. I appreciate the need to add in NFPA 2500, but the language needs to be shortened. Currently, internal tape does not even give the edition year. The required verbiage on the internal identification tape should be revised to something not as lengthy, such as, "MEETS REQUIREMENTS OF ... OF NFPA 2500 for NFPA 1983, [certification organization's label, symbol, or identifying mark], [Name of Manufacturer], [Year and quarter of manufacture (not coded)] for 25.1.1.13, 25.2.1.2, 25.3.1.5, 25.4.1.12, 25.5.1.5, 25.6.1.12, and 25.7.1.11.

Second Revision No. 169-NFPA 2500-2020 [Global Comment]

Make the following change in all instances where this language appears in chapter 25, leaving any additional language in the section as is:

TO BE COMPLIANT WITH NFPA 1983, INCORPORATED IN THE 2022 EDITION OF NFPA 2500, THE FOLLOWING ADDITIONAL COMPONENTS . . .

25.9.1.15, 25.10.1.15, 25.11.1.10, 25.16.1.12, 25.19.1.13, 25.22.1.12, 25.23.1.11, 25.24.1.11, 25.25.1.12.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 11:16:14 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-169-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
21 Affirmative All
1 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

Metz, Jeremy

Murray, James E.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Newsom, Amanda H.

This SR is adding the phrase, " INCORPORATED IN THE 2022 EDITION OF NFPA 2500" into compliance statement where additional specific components are required for the product to be in compliance. Since the relationship of NFPA 2500 to NFPA 1983 will already be given on the product label in the required NFPA compliance statement, this additional label verbiage should be simplified to only give NFPA 2500. The revised language should be "TO BE COMPLIANT WITH NFPA 2500, THE FOLLOWING ADDITIONAL COMPONENTS MUST BE USED ..." for 25.9.1.15, 25.10.1.15, 25.11.1.10, 25.16.1.12, 25.19.1.13, 25.22.1.12, 25.23.1.11, 25.24.1.11,and 25.25.1.12. This will take up less space on the label and still gives the appropriate message.

Negative with Comment

McKently, John

I am voting negative as a practical matter. The currently required language is difficult enough to include on some products and it is now longer. I understand NFPA's desire to recognize the consolidation of the standards but this was accomplished through a global editorial change not subject to discussion by the Committee and does it do anything to further the understanding of the user by including the extra wording on the product?

Second Revision No. 171-NFPA 2500-2020 [Global Comment]

In all instances in chapter 30, with the exception of 30.1.1, where a standard number is given in parentheses for NFPA 1983, 1858, or 1670, delete the parenthetical reference, leaving the chapters as is. For example, "chapters 4 through 23~~(1670)~~ ."

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 12:05:42 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-171-NFPA 2500-2020

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
22 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Negative with Comment

McCurley, Loui

Parenthetical references will help user education for this first edition of 2500

Second Revision No. 172-NFPA 2500-2020 [Global Comment]

In all instances where this phrase appears, add the following language:

. . . NFPA 1983–compliant . . . , incorporated in the 2022 edition of NFPA 2500.

30.1.8(5), 30.3.1.1, 30.17.1 (both numbered sections), 30.19.1.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 12:06:26 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-172-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Dacey, Paul
Dunn, Charles S.
Mignogno, Craig P.

Affirmative All

Arrington, Joseph
Brads, Jamey B.
Broccolo, Richard J.
Dempsey, Keith B.
Farris, Josh
Galtieri, Richard
Garber, Richard

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Hess, Diane B.

Im sure editors will catch , but typo in incorporated , needs repair inco rporated

Second Revision No. 5-NFPA 2500-2020 [Section No. 1.2]

1.2 Purpose.

The purpose of this standard is to specify minimum requirements for the following:

(1) Identifying and establishing levels of functional capability for conducting operations at technical search and rescue incidents while minimizing threats to rescuers

(2) Establishing minimum levels of performance for life safety rope, escape and fire escape rope, escape and fire escape webbing, water rescue throwlines, moderate elongation laid life-saving rope, manufacturer-supplied eye terminations, life safety harnesses, belts, victim extrication devices, ~~litters, escape webbing, escape systems, and~~ end-to-end and multiple configuration straps, belay devices, carabiners and snap links, descent control devices, escape anchors, litters, portable anchors, pulleys, rope grab and ascending devices, escape and fire escape systems, manufactured systems, and other auxiliary equipment for emergency services personnel

(3) Establishing a program for life safety rope and equipment to reduce the risks and hazards when used for emergency services

Submitter Information Verification

Committee: FAE-SCE

Submittal Date: Mon Oct 26 11:49:05 EDT 2020

Committee Statement

Committee Statement: Modifying the paragraph to include all types of equipment covered by NFPA 1983 (contained within NFPA 2500). This also is consistent with 24.1.1.1.

Response Message: SR-5-NFPA 2500-2020

Public Comment No. 3-NFPA 2500-2020 [Section No. 1.2]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 104-NFPA 2500-2020 [Section No. 2.2]

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

~~NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2018 edition.~~

NFPA 470, *Hazardous Materials Standards for Responders,* 2022 edition.

NFPA 1006, *Standard for Technical Rescue Personnel Professional Qualifications,* 2021 edition.

NFPA 1091, *Standard for Traffic Incident Management Personnel Professional Qualifications,*2019 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program,* ~~2018~~ 2021 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System and Command Safety,* ~~2014~~ 2020 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2018 edition.

NFPA 1983, *Standard on Life Safety Rope and Equipment for Emergency Services,* 2017 edition.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Oct 27 11:49:42 EDT 2020

Committee Statement

Committee Statement: Correcting editions of NFPA publications.
Response Message: SR-104-NFPA 2500-2020

Public Comment No. 4-NFPA 2500-2020 [Section No. 2.2]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 105-NFPA 2500-2020 [Section No. 2.3.2]

2.3.2 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus*, 2019.

ASTM D4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)*, 2012, reapproved 2016.

ASTM D6413/D6413M, *Standard Test Method for Flame Resistance of Textiles (Vertical Test)*, 2015.

ASTM D7138, *Standard Test Method to Determine Melting Temperature of Synthetic Fibers*, 2016.

ASTM E794, *Standard Test Method for Melting and Crystallization Temperatures by Thermal Analysis*, 2006, reapproved 2018.

ASTM F1740, *Standard Guide for Inspection of Nylon, Polyester, or Nylon/Polyester Blend, or Both Kernmantle Rope*, 1996, reapproved 2018.

ASTM F1772, *Standard Specification for Harnesses for Rescue and Sport Activities,* 2017.

ASTM F1956, *Standard Specification for Rescue Carabiners*, ~~2013~~ 2020 .

ASTM F2436, *Standard Test Method for Measuring the Performance of Synthetic Rope Rescue Belay Systems Using a Drop Test,* 2014, reapproved 2019.

ASTM F2821, *Standard Test Methods for Basket Type Rescue Litters,* 2015, reapproved 2020 .

ASTM F2894, *Standard Test Method for Evaluation of Materials, Protective Clothing and Equipment for Heat Resistance Using a Hot Air Circulating Oven*, 2019.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Oct 27 11:50:58 EDT 2020

Committee Statement

Committee Statement: Update to referenced publications editions.

Response Message: SR-105-NFPA 2500-2020

Public Comment No. 5-NFPA 2500-2020 [Section No. 2.3.2]

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 133-NFPA 2500-2020 [Section No. 3.3.200]

~~**3.3.200** Soiled/Soiling.~~

~~The accumulation of materials that are not considered hazardous materials, body fluids, or CBRN terrorism agents but that could degrade the performance of the life safety rope and equipment.~~

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Nov 10 22:25:46 EST 2020

Committee Statement

Committee Statement: Definition removed as it is no longer accurate.
Response Message: SR-133-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 109-NFPA 2500-2020 [New Section after 3.3.235]

3.3.233* Universal Precautions.

An approach to infection control in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

A.3.3.233 Universal Precautions.

Under circumstances in which differentiation between body fluids is difficult or impossible, all body fluids should be considered potentially infectious materials.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Oct 27 12:12:46 EDT 2020

Committee Statement

Committee Statement: Added definition for Universal Precautions and associated annex material as this term is used in 1858.

Response Message: SR-109-NFPA 2500-2020

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Dacey, Paul
Dunn, Charles S.
Mignogno, Craig P.

Affirmative All

Arrington, Joseph
Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 13-NFPA 2500-2020 [New Section after 3.3.235]

3.3.21 Body Fluids.

Fluids that are produced by the body, including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluids, cerebrospinal fluid, synovial fluid, and pericardial fluid.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:41:46 EDT 2020

Committee Statement

Committee Statement: These definitions are helpful related to NFPA 1858 sections and the cleaning requirements.

Response Message: SR-13-NFPA 2500-2020

Public Comment No. 84-NFPA 2500-2020 [New Section after 3.3]

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 14-NFPA 2500-2020 [New Section after 3.3.235]

3.3.26 Care.

Cleaning and storage of protective clothing and equipment.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:43:06 EDT 2020

Committee Statement

Committee Statement: These definitions are helpful related to NFPA 1858 sections and the cleaning requirements.

Response Message: SR-14-NFPA 2500-2020

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 15-NFPA 2500-2020 [New Section after 3.3.235]

3.3.31* Cleaning.

The act of removing soiling and contamination from ensembles and ensemble elements by mechanical, chemical, thermal, or combined processes.

A.3.3.31 Cleaning.

Cleaning is considered separate from the use of disinfectants and sanitizers; however, some cleaning processes might also effectively remove biological contamination. Removal of biological contamination is covered under disinfection and sanitization.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:46:28 EDT 2020

Committee Statement

Committee Statement:	These definitions are helpful related to NFPA 1858 sections and the cleaning requirements.
Response Message:	SR-15-NFPA 2500-2020

Ballot Results

This item has passed ballot

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 17-NFPA 2500-2020 [New Section after 3.3.235]

3.3.45* Decontamination.

The act of removing contamination from or neutralizing contamination in protective clothing and equipment. *(See also 3.3.31 , Cleaning.)*

A.3.3.45 Decontamination.

Decontamination is specific to the removal or neutralization of contamination whereas cleaning can remove both soiling and contamination. Decontamination might also apply to certain types of specialized cleaning where particular procedures are used to remove or neutralize contaminants other than products of combustion that are found on protective ensembles or elements.

Decontamination might involve mechanical, chemical, thermal, or combined processes for removing or neutralizing contaminants. An example of a mechanical process is where brushing or wiping removes an exterior contaminant from the surface of the element. Chemical processes involve the use of detergents or other cleaning agents that react with or aid in the removal of contaminants from element materials. Heating is one type of a thermal process where higher temperatures could cause certain contaminants to evaporate out of the element materials. Laundering is a form of a combined process where the machine agitation, use of a detergent, and heated water all work together to remove contaminants from the element.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:48:08 EDT 2020

Committee Statement

Committee Statement:	These definitions are helpful related to NFPA 1858 sections and the cleaning requirements.
Response Message:	SR-17-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 18-NFPA 2500-2020 [New Section after 3.3.235]

3.3.204* Soiling.

The accumulation of sweat, dust, dirt, debris, and other nonhazardous materials on or in an ensemble or ensemble element that could degrade its performance or cause hygiene issues.

A.3.3.204 Soiling.

Soiling excludes contaminants that could adversely affect the wearer such as products of combustion and other hazardous materials, including toxic, corrosive, or sensitizing chemicals, potentially infectious body fluids, other infectious microorganisms, and CBRN terrorism agents. Since many fireground exposures with entry into a structure will involve exposure to combustion products that contain hazardous chemicals and other substances including carcinogens, any exposure to these conditions could result in contamination.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:49:08 EDT 2020

Committee Statement

Committee Statement: These definitions are helpful related to NFPA 1858 sections and the cleaning requirements.
Response Message: SR-18-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 7-NFPA 2500-2020 [Section No. 24.1.1.1]

24.1.1.1

Chapters 24 through 28 shall specify minimum design, performance, testing, and certifications requirements for life safety rope, escape and fire escape rope, throwlines, escape and fire escape webbing, moderate elongation laid life-saving rope, manufacturer-supplied eye terminations, life safety harnesses, belts, victim extrication devices, end-to-end and multiple configuration straps, belay devices, carabiners and snap links , descent control devices, escape anchors, litters, portable anchors, pulleys, rope grab and ascending devices, other auxiliary equipment, escape and fire escape systems, and manufactured systems for emergency services personnel.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 11:57:24 EDT 2020

Committee Statement

Committee Statement: Snap Links were inadvertently omitted from the list of applicable items.
Response Message: SR-7-NFPA 2500-2020

Public Comment No. 6-NFPA 2500-2020 [Section No. 24.1.1.1]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Murray, James E.

The correct term, more in line with ANSI standards would be snaphook.

Second Revision No. 68-NFPA 2500-2020 [Section No. 24.1.2.1]

24.1.2.1*

The purpose of Chapters 24 through 28 shall be to establish minimum levels of performance for life safety rope, escape and fire escape rope, throwlines, escape and fire escape webbing, moderate elongation laid life-saving rope, manufacturer-supplied eye terminations, life safety harnesses, belts, victim extrication devices, end-to-end and multiple configuration straps, belay devices, carabiners and snap links , descent control devices, escape anchors, litters, portable anchors, pulleys, rope grab and ascending devices, other auxiliary equipment, escape and fire escape systems, and manufactured systems for emergency services personnel.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 17:07:22 EDT 2020

Committee Statement

Committee Statement: Snap Links were inadvertently omitted from the list of applicable items.
Response Message: SR-68-NFPA 2500-2020

Public Comment No. 7-NFPA 2500-2020 [Section No. 24.1.2.1]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Murray, James E.

The correct term, more in line with ANSI standards would be snaphook.

Second Revision No. 69-NFPA 2500-2020 [Section No. 24.1.3.1]

24.1.3.1

Chapters 24 through 28 shall apply to the design, performance, testing, and certification of new emergency services life safety rope, escape and fire escape rope, throwlines, escape and fire escape webbing, moderate elongation laid life-saving rope, manufacturer-supplied eye terminations, life safety harnesses, belts, victim extrication devices, end-to-end and multiple configuration straps, belay devices, carabiners and snap links , descent control devices, escape anchors, litters, portable anchors, pulleys, rope grab and ascending devices, other auxiliary equipment, escape and fire escape systems, and manufactured systems.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 17:07:50 EDT 2020

Committee Statement

Committee Statement: Snap Links were inadvertently omitted from the list of applicable items.
Response Message: SR-69-NFPA 2500-2020

Public Comment No. 8-NFPA 2500-2020 [Section No. 24.1.3.1]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
22 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Affirmative with Comment

Murray, James E.

The correct term, more in line with ANSI standards would be snaphook.

Second Revision No. 164-NFPA 2500-2020 [Section No. 24.1.3.5]

24.1.3.5

Chapters 24 through 28 shall not apply to use requirements for life safety rope and associated life safety rope equipment because those requirements are specified in NFPA 1500 and NFPA 1858, incorporated in the 2022 edition of this standard .

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 10:21:38 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-164-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Dacey, Paul
Dunn, Charles S.
Mignogno, Craig P.

Affirmative All

Arrington, Joseph
Brads, Jamey B.
Broccolo, Richard J.
Dempsey, Keith B.
Farris, Josh
Galtieri, Richard
Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 165-NFPA 2500-2020 [Section No. 24.2.1]

24.2.1

The process of certification for product as being compliant with NFPA 1983, incorporated in the 2022 edition of this standard, shall meet the requirements of Section 24.2, General; Section 24.3, Certification Program; Section 24.4, Inspection and Testing; Section 24.5, Recertification; Section 24.6, Manufacturer's Quality Assurance Program; Section 24.7, Hazards Involving Compliant Product; Section 24.8, Manufacturers' Investigation of Complaints and Returns; and Section 24.9, Manufacturers' Safety Alert and Product Recall Systems.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 10:23:45 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-165-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Dacey, Paul
Dunn, Charles S.
Mignogno, Craig P.

Affirmative All

Arrington, Joseph
Brads, Jamey B.
Broccolo, Richard J.
Dempsey, Keith B.
Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 166-NFPA 2500-2020 [Section No. 24.2.4]

24.2.4

Manufacturers shall not claim compliance with portions or segments of the requirements ofNFPA 1983 , incorporated in the 2022 edition of this standard, and shall not use the NFPA name or the name or identification of this standard~~, NFPA 1983 ,~~ in any statements about their respective products unless the products are certified as compliant to this standard.

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Nov 30 10:25:20 EST 2020

Committee Statement

Committee Statement: Properly referencing standards.
Response Message: SR-166-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 8-NFPA 2500-2020 [Section No. 24.2.8]

24.2.8

The certification organization shall not issue any new certifications to the 2017 edition of NFPA 1983 on or after the NFPA effective date for NFPA 1983 , incorporated in the 2022 edition~~, which is effective date plus 12 months~~ of this standard .

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:01:09 EDT 2020

Committee Statement

Committee Statement: The effective date plus 12 months should not apply to when the certification organization issues new certifications. The certification organization should cease to offer to new certifications upon the effective date of the standard. Adds clarification that this applies to the NFPA 1983 contained within NFPA 2500.

Response Message: SR-8-NFPA 2500-2020

Public Comment No. 71-NFPA 2500-2020 [Section No. 24.2.8]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 98-NFPA 2500-2020 [Section No. 24.2.9]

24.2.9

The certification organization shall not permit any manufacturer to continue to label any ~~protective ensembles or ensemble elements~~ products that are certified as compliant with the 2017 edition of NFPA 1983 after [effective date, plus 12 months].

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Tue Oct 27 11:03:21 EDT 2020

Committee Statement

Committee Statement:	This standard does not cover ensembles or ensemble elements therefore it is changed to products.
Response Message:	SR-98-NFPA 2500-2020

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Dacey, Paul
Dunn, Charles S.
Mignogno, Craig P.

Affirmative All

Arrington, Joseph
Brads, Jamey B.
Broccolo, Richard J.
Dempsey, Keith B.
Farris, Josh
Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

Second Revision No. 9-NFPA 2500-2020 [Section No. 24.4.5]

24.4.5

Inspection by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information as applicable are at least as specified for the products identified in Chapter 25 ~~25.1.1 , Life Safety Rope Label Requirements~~ .

Submitter Information Verification

Committee: FAE-SCE
Submittal Date: Mon Oct 26 12:11:23 EDT 2020

Committee Statement

Committee Statement: This requirement in the annual verification requirements should not just apply to Life Safety Rope it should apply to all items covered by this standard.

Response Message: SR-9-NFPA 2500-2020

Public Comment No. 17-NFPA 2500-2020 [Section No. 24.4.5]

Ballot Results

✔ **This item has passed ballot**

27 Eligible Voters
4 Not Returned
23 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Dacey, Paul

Dunn, Charles S.

Mignogno, Craig P.

Affirmative All

Arrington, Joseph

Brads, Jamey B.

Broccolo, Richard J.

Dempsey, Keith B.

Farris, Josh

Galtieri, Richard

Garber, Richard

Hess, Diane B.

Howard, Thomas

Kesler, Richard

Legros, Stephen

Lehtonen, Karen E.

McCurley, Loui

McKently, John

Metz, Jeremy

Murray, James E.

Newsom, Amanda H.

Plunkett, Matthew Gerald

Rihn, John F.

Schoppa, Kimberly

Simmonds, Robert

Statham, Denise N.

Tarley, Jay L.

NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

MEMORANDUM

TO: Technical Committee on Emergency Medical Services Protective Clothing and Equipment

FROM: Yvonne Smith, *Committee Administrator*

DATE: February 22, 2021

SUBJECT: NFPA 1990 Second Draft Technical Committee FINAL Ballot Results (CustA2021)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

17 **Members Eligible to Vote**
6 **Members Not Returned** (*Area, Billings, Bogucki, J. Davis, T. Davis, Patrick*)

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^2/_3$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

1 Batterymarch Park, Quincy, MA 02169-7471 • p: 617-770-3000 • f: 617-770-0700 • nfpa.org

Second Revision No. 97-NFPA 1990-2020 [Chapter 9]

9-deleted ~~Certification (NFPA 1999)-DELETED~~

~~**9.1** Administration.~~

~~**9.1.1** Scope.~~

~~**9.1.1.1***~~

~~This standard shall specify the minimum design, performance, testing, documentation, and certification requirements for new single-use and new multiple-use emergency medical services protective clothing, including garments, helmets, gloves, footwear, and face protection devices, used by emergency medical personnel and used by health care workers providing medical and supportive care.~~

~~**A.9.1.1.1**~~

~~This standard addresses only emergency medical products and the design, performance, testing, and certification of specific products. For fire departments and fire department-based EMS services, the use criteria for emergency medical protective ensembles or protective clothing are covered in NFPA 1500 and NFPA 1581 .~~

~~This document is intended to address the wide range of potential threats to emergency medical personnel from the time of in-the-field incident intervention through the time of medical facility emergency room treatment. These threats range from mechanical to biological and can impact each individual in a variety of ways. Emergency medical personnel should be trained to understand and respect the potential hazards inherent to the field. It is essential that each worker evaluate the circumstances of each incident and appropriately evaluate the level of personal protection needed to protect themselves from the transmission of diseases and blood/body fluid–borne pathogens. The methods of transmission of currently known diseases are well known. Emergency medical personnel are trained to understand these methodologies and protect themselves as well as the patient from incidental exposure. However, new diseases emerge every day, further necessitating the vigilance of emergency medical personnel to protect themselves from unnecessary exposure.~~

~~This document provides emergency medical personnel with a wide array of personal protective clothing and equipment that can significantly reduce the possibility of exposure to body fluid–borne pathogens. This document has also been expanded to include limited protection from CBRN hazards.~~

~~The hazards associated with emergency medical services can be generally classified by the following groups:~~

> ~~*Physical hazards.* Protection is needed against cuts, punctures, abrasive surfaces, falling objects, incidental flame contact, projectiles, and environmental hazards such as rain and extreme ambient temperatures.~~
>
> ~~*Body fluid–borne pathogen hazards.* Protection is needed to reduce skin and particularly mucus membrane exposure to body fluid–borne pathogens.~~
>
> ~~*Chemical and biological agents.* Protection is needed to reduce the cross contamination of exposed victims to emergency medical personnel during rescue, triage, decontamination, pre-transport emergency medical treatment, transport, and treatment at the receiving medical facility. Specialized decontamination and/or isolation can be initiated at the emergency scene and continued at the receiving medical facility.~~

~~This document is designed to offer a wide range of protective clothing and equipment options to meet the specific functional needs of emergency medical personnel performing a wide variety of tasks, working in a variety of environments, and with varying degrees of control over exposure and environmental threats. The frequency and severity of exposure can also be addressed in the provision of protective clothing designed for single use as well as protective clothing designed for multiple uses and certified as compliant with this standard.~~

~~Research and testing for the development of criteria specific to single-use garments, cleaning/utility gloves, footwear covers, eye and face protection devices, and helmets was supported by the NIOSH National Personal Protective Technology Laboratory as addressed in the report, "Improvement of Criteria for EMS Personal Protective Equipment."~~

~~**9.1.1.2**~~

~~This standard shall also specify additional minimum design, performance, testing, documentation, and certification requirements for single-use and multiple-use emergency medical protective ensembles comprising the protective clothing items described in 9.1.1 for protection from airborne and liquid-borne pathogens.~~

~~**9.1.1.3***~~

~~This standard shall not be interpreted as specifying requirements for protection from CBRN terrorism agents, radiological agents, hazardous chemicals, flammable or explosive atmospheres, or thermal hazards.~~

~~**A.9.1.1.3**~~

~~Organizations responsible for CBRN first responders, chemical response functions, and other hazard protection, including radiological, cryogenic, or hazardous chemicals, should use protective ensembles and protective clothing specifically designed for those activities.~~

~~Specific criteria for [C]BRN protective ensembles previously addressed in the 2008 and 2013 editions of NFPA 1999 were moved to the 2016 edition of NFPA 1994 . NFPA 1994 established requirements for biological/radiological particulate protection as part of the Class 4 requirements. The 2012 edition of NFPA 1994 specified criteria for single-use [C]BRN protective ensembles; however, the 2017 edition of NFPA 1994 included [C]BRN protection criteria for both single- and multiple-use protective ensembles.~~

~~Criteria for protection from hazardous materials are provided in NFPA 1991, NFPA 1992, and NFPA 1994.~~

~~Specific criteria addressing respiratory protection are not covered in this standard. However, responders and receivers that are engaged in emergency medical services involving airborne pathogens or other respiratory hazards should wear appropriate respiratory protection. At a minimum, appropriate respiratory protection should include filtering facepieces that are certified by the National Institute for Occupational Safety and Health (NIOSH). P-100 air-purifying respirators will provide the highest level of particulate protection. In addition, responders and receivers engaged in operations involving [C]BRN hazards should, as a minimum, wear air-purifying respirators that are certified by NIOSH as CBRN air-purifying respirators (CBRN APRs) or certified by NIOSH as CBRN powered air-purifying respirators (CBRN PAPRs).~~

~~Biological agents can also be transmitted via aerosols, which are a hazard by inhalation, and in some cases, by dermal exposure. Organizations responsible for biological hazard protection should use protective clothing and respiratory protection specifically designed for those activities, including protective ensembles that are designed for [C]BRN protection covered under this standard. Criteria for protection from chemical agents, airborne and liquid-borne biological hazards, and particulate hazards are also provided in NFPA 1994 .~~

~~**9.1.1.4**~~

~~This standard shall also specify requirements for respiratory protective devices that are not already covered in 42 CFR 84, "Approval of Respiratory Protective Devices," intended for emergency medical operations by first responders, first receivers, and health care workers providing medical and supportive care.~~

~~**9.1.1.5***~~

~~Certification of all emergency medical ensemble elements and protective clothing items and of all medical care facility ensemble elements and protective clothing items as compliant with the requirements of this standard shall not preclude certification to additional appropriate standards where the ensemble elements or protective clothing items meet all applicable requirements of each standard.~~

~~**A.9.1.1.5**~~

~~Examples of other potential standards to which specific protective clothing or ensembles can be certified depending on their materials, components, and overall design include but are not limited to the following:~~

~~(1) NFPA 1951 establishes requirements for two types of ensembles for utility and rescue and recovery technical rescue operations. Protective garments, gloves, and footwear for rescue and recovery technical rescue include performance criteria for viral penetration resistance and overall product liquid integrity. The standard also includes additional criteria for flame, heat, and thermal insulation performance that is not currently addressed in this standard.~~

~~(2) NFPA 1992 establishes requirements for protective clothing that is intended to provide protection against liquid chemical splashes that can occur during hazardous material operations. The requirements in the standard for garments, gloves, footwear, and ensemble includes liquid penetration resistance of materials and seams against a selected battery of chemicals as well as the demonstration of overall liquid integrity for full products.~~

~~(3) NFPA 1994 establishes four different classes of ensembles addressing the hazards present during chemical terrorism incidents. These ensembles consist of full body one- or multi-piece suits, gloves, and footwear. Depending on the class, different types of respirators are worn with the ensemble and varying levels of material barrier performance and overall product integrity are applied. Class 1 and Class 2 ensembles are designed for use with CBRN SCBA that can be worn either inside or outside the ensemble, while Class 3 and Class 4 ensembles are designed for use with CBRN APR or PAPR. Different levels of material barrier performance criteria are applied for ensemble material and seam chemical permeation resistance against both chemical warfare agents and toxic industrial chemicals for Class 1, Class 2, and Class 3 ensembles. Viral penetration resistance is applied to the material and seams of all ensemble materials for each class. Different levels of overall product integrity are applied to each class of ensemble. Class 1, Class 2, and Class 3 ensembles are evaluated using the Man-In-Simulant Test (MIST) while Class 4 ensembles are evaluated for inward particle leakage. All ensembles are evaluated for overall liquid integrity. Different levels of material physical properties and component functionality are specified for each ensemble class. Both base and ruggedized performance levels are set for ensemble Class 2, Class 3, and Class 4.~~

~~**9.1.1.6***~~

~~This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant emergency medical services protective clothing for the protection of their personnel. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of protective clothing to establish safety and health practices and determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, or testing.~~

~~A.9.1.1.6~~

~~This standard provides a range of different types of protective clothing and equipment that can be used in the provision of patient care and transportation prior to arrival at medical care facilities by emergency medical personnel, patient care provided by personnel at medical care facilities, and body recovery by emergency medical personnel. The selection of protective clothing and equipment for emergency medical services should consider a hazard assessment by the department or organization responsible for employees involved in emergency medical services. The hazard assessment should be in accordance with 29 CFR 1910.132, "Personal Protective Equipment: General Requirements," to ensure compliance with 29 CFR 1910.1030, "Bloodborne Pathogens," or the applicable local, state, regional, or national regulations. The hazard assessment should identify the specific risks of emergency medical responders or medical first receivers to hazards that include, but are not limited to, those listed in Table A.9.1.1.6(a) .~~

~~Table A.9.1.1.6(a) List of Potential Emergency Medical and Related Hazards~~

~~**Biological Hazards**~~	~~**Thermal Hazards**~~
~~Bloodborne pathogens~~	~~High convective heat~~
~~Airborne pathogens~~	~~Low radiant heat~~
~~Biological toxins~~	~~High radiant heat~~
~~Biological allergens~~	~~Flame impingement~~
~~**Chemical Hazards**~~	~~Steam~~
~~Inhalation~~	~~Hot liquids~~
~~Skin absorption or contact~~	~~Molten metals~~
~~Chemical ingestion or injection~~	~~Hot solids~~
~~Liquefied gas contact~~	~~Hot surfaces~~
~~Chemical flashover~~	~~**Electrical Hazards**~~
~~Chemical explosions~~	~~High voltage~~
~~**Physical Hazards**~~	~~Electrical arc flashover~~
~~Falling objects~~	~~Static charge buildup~~
~~Flying debris~~	~~**Person-Position Hazards**~~
~~Projectiles or ballistic objects~~	~~Daytime and nighttime visibility~~
~~Abrasive or rough surfaces~~	~~Falling from elevated surfaces~~
~~Pointed objects~~	~~Drowning~~
~~Slippery surfaces~~	~~**Person-Equipment Hazards**~~
~~Excessive vibration~~	~~Material biocompatibility~~
~~**Environmental Hazards**~~	~~Ease of contamination~~
~~High heat and humidity~~	~~Thermal comfort~~
~~Ambient cold~~	~~Range of motion~~
~~Wetness~~	~~Hand function~~
~~High wind~~	~~Ankle and back support~~
~~Insufficient or bright light~~	~~Vision clarity~~
~~Excessive noise~~	~~Communications ease~~
~~**Radiation Hazards**~~	~~Fit (poor)~~
~~Ionizing radiation~~	~~Ease of donning and doffing~~
~~Nonionizing radiation~~	-

~~It is important to recognize that the protective clothing specified in this standard does not protect against all of the hazards listed in Table A.9.1.1.6(a) . In identifying the potential hazards, the department or organization should determine the likelihood and consequence of exposure. The combination of these two factors should establish the risk of exposure and permit the prioritization of protection needs.~~

~~Because the requirements in this standard were designed to provide individuals with some protection against hazards associated with bloodborne pathogen exposure, it is important that the selected clothing and equipment enable the department or organization to comply~~

~~with 29 CFR 1910.1030, " Bloodborne Pathogens." These regulations require that employers (i.e., departments and organizations) provide appropriate protective clothing and equipment to their workers. Appropriate protective clothing and equipment are defined as those items that prevent blood and other infectious liquids from passing through the clothing or equipment item to the wearer's skin or underclothing. For this reason, a principal component of most clothing and equipment requirements in this standard is a test that demonstrates the barrier performance of the item and the material in preventing liquid penetration. Additional requirements are added to demonstrate that the respective clothing or equipment item provides some degree of protection against other hazards that are relevant to the use of that item that might commonly be anticipated as part of emergency medical operations.~~

~~As part of the hazard and risk assessment conducted by the department or organization, it is important that the department or organization consider which portions of the body might become exposed. Exposures might occur to the arms and legs, as well as to the head (including the eyes, ears, and face), hands, feet, and respiratory system. Protective clothing and equipment should be specified for any body area that is at risk of exposure.~~

~~Table A.9.1.1.6(b) provides some factors for consideration of each of the protective clothing items addressed in this standard.~~

~~Table A.9.1.1.6(b) Selection Factors for Emergency Protective Clothing and Equipment~~

~~**Protected Area**~~	~~**Clothing or Equipment**~~	~~**Selection Factors**~~
~~Body (arms and legs)~~	~~Single-use protective garments~~	~~Could cover body entirely or partially (protection is provided only to that part of the body that is covered).~~
-	-	~~Partial body clothing might not provide protection to interface areas unless the item is designed to interface effectively with the other item (e.g., sleeve protective with garment).~~
-	-	~~Clothing material might not be breathable, which will affect wearing comfort.~~
-	-	~~Single-use items tend to be less durable than multiple-use items.~~
-	-	~~Might be subject to degradation in rigorous physical environments.~~
-	~~Multiple-use protective garments~~	~~Factors above apply, except multiple-use items are designed to be cleaned and reused while maintaining their performance properties.~~
~~Hands~~	~~Single-use examination gloves~~	~~Intended to provide protection to hand and wrist for one-time use with a maximum of dexterity and tactility.~~
-	-	~~Fit intimately with hand and appropriate size must be selected.~~
-	-	~~Can be subject to degradation in rigorous physical environments.~~
-	~~Single-use cleaning/utility gloves~~	~~More robust and likely to resist physical hazards compared to examination gloves.~~
-	-	~~More resistant to chemical solvents used in cleaning.~~
-	-	~~Intended for single use only.~~
-	~~Multiple-use work gloves~~	~~Intended to provide barrier protection, but with sacrifice of dexterity and tactility as compared to examination and cleaning/utility gloves.~~
-	-	~~Can be used repeatedly if properly cared for and maintained, unless gloves cannot be properly decontaminated.~~
-	-	~~Not flame or heat resistant and should not be used in thermal hazard environments.~~

~~Protected Area~~	~~Clothing or Equipment~~	~~Selection Factors~~
~~Eyes/face~~	~~Single-use facemask~~	~~Can cover only mouth and nose (visors are optional).~~
-	-	~~Visors do not provide primary eye protection and might not be effective for eye splash protection.~~
-	-	~~Requirement for wearer to breathe through mask lowers bloodborne pathogen penetration resistance as compared to garments, gloves, and footwearand other eye/face protection devices.~~
-	-	~~Might be subject to degradation in rigorous physical environments.~~
-	-	~~Intended for single-use only.~~
-	~~Single-use eye and face protection device~~	~~Devices such as disposable faceshield.~~
-		~~Periphery of device might not provide effective protection of entire face and eyes.~~
-	-	~~Can be subject to degradation in rigorous physical environments.~~
-	-	~~Intended for a single-use only.~~
-	~~Multiple-use eye and face protection device~~	~~Can include spectacles, goggles, or faceshields.~~
-		~~Spectacles provide only limited eye protection.~~
-	-	~~Goggles provide primary eye protection.~~
-	-	~~Faceshields do not provide primary eye protection, but provide face and primary eye protection when combined with goggles.~~
-	-	~~Intended for multiple uses if properly cared for and maintained, and if item can be cleaned following exposure.~~
~~Feet and ankles~~	~~Single-use footwear covers~~	~~Disposable item that covers shoe or boot and is intended to provide barrier (splash) protection to primary footwear.~~
-	-	~~Required to have slip-resistant wear surface.~~
-	-	~~Can be subject to degradation in rigorous physical environments.~~
-	~~Multiple-use footwear~~	~~Standard footwear with 7.62 cm (3 in.) of barrier protection.~~
-	-	~~Intended to be reusable if properly cared for and maintained, and if can be decontaminated effectively.~~
-	~~Medical care facility footwear~~	~~Same as multiple-use footwear and single-use covers, but does not have requirements for impact/compression resistance for toe and puncture resistance of sole, allowing footwear to be lighter and more flexible.~~
~~Head~~	~~Helmet~~	~~Standard industrial helmet that also includes requirements for suspension and chin strap height.~~
-	-	~~No specific criteria are included for side impact protection as might be needed for wearers inside vehicles.~~

~~9.1.1.7~~

~~This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of protective clothing and ensembles to establish safety and health practices and determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, and testing.~~

~~**9.1.1.8***~~

~~This standard shall not specify requirements for any accessories that could be attached to the certified product but are not necessary for the certified product to meet the requirements of this standard.~~

~~**A.9.1.1.8**~~

~~Fire and emergency response organizations are cautioned that accessories are not a part of the certified product but could be attached to the certified product by a means not engineered, manufactured, or authorized by the manufacturer.~~

~~Fire and emergency response organizations are cautioned that if the accessory or its means of attachment causes the structural integrity of the certified product to be compromised, the certified product might not comply with the standard for which it was designed, manufactured, and marketed. Additionally, if the accessory or its attachment means are not designed and manufactured from materials suitable for the hazardous environments of emergency incidents, the failure of the accessory or its attachment means could cause injury to the emergency responder.~~

~~Because the aftermarket for certified product accessories is so broad, fire and emergency response organizations are advised to contact both the manufacturer of the accessory and the manufacturer of the certified product and verify that the accessory and its means of attachment are suitable for use in the intended emergency response environment. Fire and emergency response organizations should seek and receive written documentation from both the accessory manufacturer and the manufacturer of the certified product to validate the following information:~~

> ~~The accessory for a certified product, and its attachment method, will not degrade the designed protection or performance of the certified product below the requirements of the product standard to which it was designed, manufactured, tested, and certified.~~
>
> ~~The accessory, when properly attached to the certified product, shall not interfere with the operation or function of the certified product, or with the operation or function of any of the certified product's component parts.~~

~~Users are also cautioned that failure of the means of attachment of the accessory to safely and securely attach the accessory to the certified product can cause the accessory to be inadvertently dislodged from the certified product and create a risk to the wearer or other personnel in the vicinity.~~

~~**9.1.1.9**~~

~~Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.~~

~~**9.1.2** Purpose.~~

~~**9.1.2.1***~~

~~The purpose of this standard shall be to establish a minimum level of protection from contact with blood and body fluid–borne pathogens for personnel performing patient care during emergency medical services.~~

~~**A.9.1.2.1**~~

~~The federal OSHA standard, 29 CFR 1910.1030(c)(3)(i), defines personal protective equipment (PPE) as appropriate "only if it does not permit blood or other potentially infectious materials to pass through or to reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used." NFPA 1999 has established the minimum performance standard for PPE for use during emergency medical operations.~~

~~The choice of which protective ensemble or which items of protective clothing to use will be based on an assessment of the hazards and the risk of exposure. Various conditions that exist at an emergency incident and at the medical facility receiving area(s) are uniquely different. Such conditions can be characterized by the uncontrolled environment and uncontained hazards.~~

~~**9.1.2.2**~~

~~The purpose of this standard shall also be to establish a minimum level of whole-body protection for emergency services personnel and medical first receivers from airborne and liquid-borne pathogens.~~

~~**9.1.2.3**~~

~~To achieve these purposes, this standard shall establish for emergency medical personnel the minimum requirements for upper and lower torso, head, hands, foot, and face protection devices to minimize skin and mucous membrane contact with body fluid–borne pathogens.~~

~~**9.1.2.4**~~

~~Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which personnel can be exposed.~~

~~**9.1.2.5***~~

~~This standard shall not be interpreted or used as a detailed manufacturing or purchase specification but shall be permitted to be referenced in purchase specifications as minimum requirements.~~

~~**A.9.1.2.5**~~

~~This standard is not designed to be utilized as a purchase specification. It is prepared, as far as practicable, with regard to required performance, avoiding restriction of design wherever possible. Purchasers should specify organizational requirements for items such as color, markings, closures, pockets, and trim patterns, or other features related to specific items, ensembles, or ensemble elements. Tests specified in this standard should not be deemed as defining or establishing performance levels for protection from all emergency medical responder and medical first receiver environments, or in all CBRN terrorism incident environments.~~

~~**9.1.3** Application.~~

~~**9.1.3.1**~~

~~This standard shall apply to the design, performance, testing, and certification of new emergency medical garments, emergency medical examination gloves, emergency medical helmets, emergency medical cleaning/utility gloves, emergency medical work gloves, emergency medical facemasks, emergency medical face protection devices, emergency medical footwear and footwear covers, care facility footwear, and single-use and multiple-use emergency protective ensembles.~~

~~**9.1.3.2**~~

~~This edition of NFPA 1990 (NFPA 1999) shall not apply to any emergency medical services protective clothing manufactured to previous editions of this standard.~~

~~**9.1.3.3**~~

~~This standard shall not apply to any emergency medical services protective clothing manufactured to the requirements of any other standard.~~

~~**9.1.3.4***~~

~~Other than the certification of emergency medical protective ensembles to the single-use and multiple-use ensemble requirements of this standard, this standard shall not apply to respiratory protection in emergency medical operations, as such requirements are specified by NIOSH in 42 CFR 84, "Approval of Respiratory Protective Devices," and by OSHA in 29 CFR 1910.134, "Respiratory Protection," and 29 CFR 1910.1030, "Bloodborne Pathogens."~~

~~A.9.1.3.4~~

~~Although not covered in this standard, with the exception of [C]BRN single-use and multiple-use protective ensembles, respiratory protection of emergency medical responders and first receivers is an important component of emergency medical operations. A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer's risk of inhaling hazardous airborne particles (including dust particles and infectious agents), gases, or vapors.~~

~~The many types of respirators available include the following:~~

~~Particulate respirators, which filter out airborne particles~~

~~"Gas masks," which filter out chemicals and gases~~

~~Airline respirators, which use compressed air from a remote source~~

~~Self-contained breathing apparatus (SCBA), which include their own air supply~~

~~Particulate respirators can be further divided into the following categories:~~

~~Disposable or filtering facepiece respirators, where the entire respirator is discarded when it becomes unsuitable for further use due to excessive resistance, sorbent exhaustion, or physical damage~~

~~Reusable or elastomeric respirators, where the facepiece is cleaned and reused but the filter cartridges are discarded and replaced when they become unsuitable for further use~~

~~Powered air-purifying respirators (PAPRs), where a battery-powered blower moves the airflow through the filters~~

~~An N-95 respirator is one of nine types of disposable particulate respirators. Particulate respirators are also known as air-purifying respirators (APR) because they protect by filtering particles out of the air as the wearer breathes. These respirators protect only against particles — not gases or vapors. Since airborne biological agents such as bacteria or viruses are particles, they can be filtered by particulate respirators.~~

~~Respirators that filter out at least 95 percent of airborne particles during worst case testing using a "most-penetrating" sized particle are given a 95 rating; those that filter out at least 99 percent receive a 99 rating; those that filter at least 99.97 percent (essentially 100 percent) receive a 100 rating.~~

~~Respirators in this family are rated as N, R, or P for protection against oils. This rating is important in industry because some industrial oils can degrade the filter performance so it does not filter properly. Respirators are rated "N" if they are not resistant to oil, "R" if somewhat resistant to oil, and "P" if strongly resistant (i.e., oil proof). Thus, there are the following nine types of disposable particulate respirators:~~

~~N-95, N-99, and N-100~~

~~R-95, R-99, and R-100~~

~~P-95, P-99, and P-100~~

~~The National Institute for Occupational Safety and Health (NIOSH) tests and approves respirators per 42 CFR 84, "Approval of Respiratory Protective Devices," for occupational uses. NIOSH-approved disposable respirators are marked with the manufacturer's name, the part number (P/N), the protection provided by the filter (e.g., N-95), and "NIOSH." This information is printed on the facepiece, exhalation valve cover, or head straps. A listing of all NIOSH-approved disposable respirators is available at cdc.gov/niosh/npptl/topics/respirators/disp_part/. If a disposable respirator does not have these markings and does not appear on one of these lists, it has not been certified by NIOSH. NIOSH also maintains a database of all NIOSH-approved respirators regardless of respirator type, the Certified Equipment List, also accessible at cdc.gov/niosh/npptl/topics/respirators/disp_part/. In addition, NIOSH provides a Respirator Selection Logic (cdc.gov/niosh/docs/2005-100/default.html), which provides guidance to respirator program administrators on respirator selection. More detailed respirator information has been published at cdc.gov/niosh/topics/respirators/default.html.~~

~~Any of the types of particulate respirators can be worn for protection against severe acute respiratory syndrome (SARS), tuberculosis (TB), or avian influenza (bird flu) if they are NIOSH-approved and if they have been properly fit-tested and maintained. All of the NIOSH-approved particulate respirators protect workers against SARS, TB, and avian influenza as effectively as the N-95 respirators. P-100 respirators should be worn for hazards such as hantavirus.~~

~~A respirator will work only if it is used correctly; thus, the key elements for respiratory protection are fit-testing and training of each worker in the use, maintenance, and care of the respirator. NIOSH considers each of the nine types of disposable particulate respirators to have similar fit characteristics. Therefore, when a worker is caring for or transporting infected patients, having a NIOSH-approved respirator that fits well is much more important than whether the respirator is an N-95 or one of the other eight types of disposable particulate respirators.~~

~~In patient care settings, the use of respirators by workers is regulated under the OSHA standard for respiratory protection. The OSHA standard sets requirements for the fit-testing of respirators to ensure a proper seal between the respirator's sealing surface and the wearer's face. The OSHA standard also contains requirements for determining that workers can use respirators safely, for training and educating employees in the proper use of respirators, and for maintaining respirators properly.~~

~~Note: Fit-testing and the other OSHA-required procedures are absolutely essential to assure that the respirator will provide the wearer with required protection. Detailed information on respiratory programs, including fit-test procedures, can be found at cdc.gov/niosh/npptl/hosprestoolkit/default.html.~~

~~Powered air-purifying respirators (PAPRs) use HEPA filters (high-efficiency particulate air filters), which are as efficient as P-100 filters and will protect against SARS, avian flu, and TB. PAPRs provide a higher level of protection than disposable respirators. Health care facilities in some SARS-affected areas have used higher levels of respiratory protection, including PAPRs, for persons present during aerosol-generating medical procedures such as bronchoscopy on SARS patients. When PAPRs are used, their reusable elements should be cleaned and disinfected after use and the filters replaced in accordance with manufacturer's recommendations. All used filters should be considered potentially contaminated with infectious material and must be safely discarded.~~

~~Design and performance requirements for medical face masks are included in this standard. These items are commonly known as surgical masks. Surgical masks are not designed for use as particulate respirators and do not provide as much protection as an N-95 respirator. Most surgical masks do not effectively filter small particles from air and do not prevent leakage around the edge of the mask when the user inhales.~~

~~When a respirator is cleared by the Food and Drug Administration (FDA) as a surgical mask and certified by NIOSH as an N-95 respirator mask, the FDA calls it a "surgical N-95 respirator." Surgical masks and surgical N-95 respirators are regulated by the FDA. The FDA evaluates the performance of these devices in areas including fluid resistance and filtration efficiency to ensure that they are at least as safe and effective as similar devices already on the market. The FDA encourages manufacturers to follow specific performance standards for their masks, and also requires that these products be produced using good manufacturing practices.~~

~~Surgical masks and surgical N-95 respirators are disposable devices that cover the mouth and nose during medical procedures. They can help protect the caregiver and patient against microorganisms, body fluids, and small particles in the air, but care should be taken for the selection and use of a surgical mask (medical facemask) versus a surgical N-95 respirator.~~

~~The following are types of masks and respirators used in patient care:~~

- ~~Surgical masks, as follows:~~
  - ~~Include masks labeled as surgical, laser, isolation, dental, or medical procedure~~
  - ~~Intended to protect against microorganisms, body fluids, and large particles in the air~~

~~Designed to cover the mouth and nose loosely; not sized for individual fit~~

~~Intended to prevent exposure to the wearer's saliva and respiratory secretions~~

~~Made of soft materials and comfortable to wear~~

~~Usually packaged in boxes of single-use masks~~

~~Surgical N-95 respirators, as follows:~~

~~Surgical masks designed to protect against small droplets of respiratory fluids and other airborne particles in addition to the same protections as surgical masks~~

~~Fit closely to form a tight seal over the mouth and nose~~

~~Require fit-testing and must be adjusted to your face to provide intended effectiveness~~

~~Might be uncomfortable due to tight fit~~

~~Usually packaged as single devices or in boxes of single-use devices~~

~~The CDC recommends the use of surgical masks or surgical N-95 respirators based on the ways that specific diseases are transmitted. For more information about CDC recommendations, see Healthcare-Associated Infections at cdc.gov/hai .~~

~~A surgical mask should be chosen for the following reasons:~~

~~For protection if splattered by someone's body fluids, such as blood, respiratory secretions, vomit, urine, or feces~~

~~For protecting others when performing surgery or caring for an open wound~~

~~A surgical N-95 respirator should be chosen to provide the same protections as a surgical mask as well as for the following reasons:~~

~~To prevent being exposed to very small particles (e.g., fine aerosolized droplets) such as those produced by coughing~~

~~To care for persons with known or suspected pulmonary and laryngeal TB per OSHA regulations~~

~~Users should be aware of the following information before using surgical masks and surgical N-95 respirators:~~

~~The use of surgical masks and surgical N-95 respirators alone will not provide full protection from acquiring an infection. Other infection control practices such as hand-washing, isolating infected patients, and practicing appropriate coughing etiquette are also important to minimize risk of infection.~~

~~Surgical N-95 respirators must be fitted properly. A surgical N-95 respirator that has not been fitted properly might leave unprotected gaps between the respirator and the face that will impair the respirator's effectiveness. Facial hair or unusual facial features make it difficult to fit surgical N-95 respirators properly.~~

~~Surgical masks are not fit-tested to a person's face and could leave unprotected gaps between the mask and the face.~~

~~Masks lose their protective properties and must be changed when they become wet from saliva or respiratory secretions.~~

~~Surgical masks and surgical N-95 respirators are not tested against specific microorganisms and should not claim to prevent specific diseases.~~

~~CDC recommendations should be consulted for using surgical masks and surgical N-95 respirators in the care of patients needing isolation precautions.~~

~~Surgical masks or surgical N-95 respirators should never be reused.~~

~~Surgical masks or surgical N-95 respirators should never be washed or disinfected.~~

~~Surgical masks or surgical N-95 respirators should never be shared with others.~~

~~The FDA's website on PPE should be consulted for information on disposing of surgical masks and surgical N-95 respirators.~~

~~While the FDA regulates respirators and other articles that are intended for use in preventing or treating infectious disease, there are a variety of respirators available for various occupational exposures that do not make medical claims and are not regulated by the FDA. Many of these respirators are intended to filter out particles of dust and mist from wood, metal, and masonry work. Nonmedical respirators are available from many sources, including hardware stores and online. Nonmedical respirators might look very similar to one another and to respirators that are regulated by the FDA. However, there are differences between nonmedical respirators and respirators cleared by the FDA as surgical N-95 respirators.~~

~~Only respirators that have passed specific testing by NIOSH can be labeled as NIOSH approved. Each NIOSH-approved respirator contains a rating, such as N-95, which refers to its certified level of filtration efficiency. If a nonmedical respirator is not labeled as NIOSH-certified, it has not been evaluated by the government to determine whether it works.~~

~~Although NIOSH-approved nonmedical respirators have met filtration efficiency requirements, they are not subject to the additional requirements of FDA-cleared surgical N-95 respirators (i.e., fluid and flammability resistance).~~

~~9.1.3.5~~

~~This standard shall not apply to the use of or conditions of use for emergency medical protective clothing and ensembles by emergency medical personnel.~~

~~9.1.3.6~~

~~This standard shall not apply to any accessories that could be attached to the certified product, before or after purchase, but are not necessary for the certified product to meet the requirements of this standard.~~

~~9.2~~ ~~General.~~

~~9.2.1~~

~~The process of certification for protective ensembles and ensemble elements as being compliant with NFPA 1999 shall meet the requirements of Sections 9.2 through 9.9 .~~

~~9.2.2~~

~~All compliant protective clothing items, protective ensembles, and ensemble elements that are labeled as being compliant with this standard shall meet or exceed all applicable requirements specified in this standard and shall be certified.~~

~~9.2.2.1~~

~~The certification organization shall permit only the certification of complete single-use and multiuse protective ensembles that include the garments, glove, footwear, and other elements specified in Section 11.7 and Section 11.8 respectively.~~

~~9.2.2.2~~

~~The certification organization shall further require that the single-use and multiuse protective ensemble manufacturer specify the respiratory protection for the ensemble.~~

~~**9.2.3**~~

~~All certification shall be performed by a certification organization that meets at least the requirements specified in Section 9.3 and that is accredited for personal protective equipment (PPE) in accordance with ISO/IEC 17065,~~ ~~*Conformity assessment — Requirements for bodies certifying products, processes and services*~~ ~~. The accreditation shall be issued by an accreditation body operating in accordance with ISO/IEC 17011,~~ ~~*Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*~~ ~~.~~

~~**9.2.4**~~

~~Manufacturers shall not claim compliance with portions or segments of the requirements of this standard and shall not use the NFPA name or the name or identification of this standard, NFPA 1999 , in any statements about their respective product(s) unless the product(s) is certified as compliant to this standard.~~

~~**9.2.5**~~

~~All compliant protective ensembles and ensemble elements shall be labeled.~~

~~**9.2.6**~~

~~All compliant protective ensembles and ensemble elements shall be listed by the certification organization. The listing shall uniquely identify the certified product, for example, by style, model number, or part number.~~

~~**9.2.6.1**~~

~~The specific listing shall identify the type of ensemble or specific ensemble element using the same terminology provided in the standard.~~

~~**9.2.6.2**~~

~~The principal materials of construction shall be identified as part of the listing.~~

~~**9.2.6.3**~~

~~Where ensembles are listed, each of the ensemble elements shall be specifically identified as part of the listing.~~

~~**9.2.7**~~

~~All compliant protective ensembles and ensemble elements shall also have a product label that meets the requirements specified in Section 10.1 .~~

~~**9.2.8***~~

~~The certification organization's label, symbol, or identifying mark shall be attached to the product label, shall be part of the product label, or shall be immediately adjacent to the product label.~~

~~A.9.2.8~~

~~From time to time the NFPA has received complaints that certain items of emergency services protective clothing or protective equipment could be carrying labels falsely identifying them as compliant with an NFPA standard. The requirement for placing the certification organization's mark on or next to the product label is to help ensure that the purchaser can readily determine compliance of the respective product through independent third-party certification.~~

~~NFPA advises those purchasing emergency medical protective ensembles or protective clothing to be aware that for emergency medical protective ensembles or protective clothing items to meet the requirements of NFPA 1999 they must be certified by an independent third-party certification organization. In addition, the item must carry the label, symbol, or other identifying mark of that certification organization.~~

~~NOTE: An emergency medical protective ensemble or protective clothing item that does not bear the mark of an independent third-party certification organization is not compliant with NFPA 1999 , even if the product label states that the item is compliant!~~

~~For further information about certification and product labeling, Chapter 9 and Chapter 10 of NFPA 1990 should be referenced. Also, the definitions for *certification/certified* , *labeled* , and *listed* in Chapter 3 should be reviewed.~~

~~Third-party certification is an important means of ensuring the quality of emergency services protective clothing and equipment. To be certain that an item is properly certified, labeled, and listed, the NFPA recommends that prospective purchasers require appropriate evidence of certification for the specific product and model from the manufacturer before purchasing. Prospective purchasers should also contact the certification organizations and request copies of the certification organization's "list" of certified products to the appropriate NFPA standard. This "listing" is a requirement of third-party certification by this standard and is a service performed by the certification organization.~~

~~All NFPA standards on emergency services protective clothing and equipment require that the item be certified by an independent third-party certification organization and, as with NFPA 1999 emergency medical protective ensembles or protective clothing items, all items of emergency services protective clothing and equipment must carry the label, symbol, or other identifying mark of that certification organization.~~

~~NOTE: Any item of protective clothing or protective equipment covered by an NFPA standard that does not bear the mark of an independent third-party certification organization is not compliant with the appropriate NFPA standard, even if the product label states that the item is compliant!~~

~~**9.2.9**~~

~~The certification organization shall not issue any new certifications to the 2018 edition of this standard on or after the NFPA effective date for the 2022 edition.~~

~~**9.2.10**~~

~~The certification organization shall not permit any manufacturer to continue to label any protective clothing items that are certified as compliant with the 2018 edition of this standard on or after the NFPA effective date for the 2022 edition.~~

~~**9.2.11**~~

~~The certification organization shall require manufacturers to remove all certification labels and product labels indicating compliance with the 2018 edition of this standard from all protective ensembles and ensemble elements that are under the control of the manufacturer on or after the NFPA effective date for the 2022 edition.~~

~~**9.2.12**~~

~~For the 2022 edition of this standard, only new or revised test methods, including sample preparation procedures, shall require testing in triplicate. Any other methods shall undergo annual sampling requirements outlined in Section 9.4 .~~

~~**9.3** Certification Program.~~

~~**9.3.1***~~

~~The certification organization shall not be owned or controlled by manufacturers or vendors of the product being certified.~~

~~**A.9.3.1**~~

~~The certification organization should have sufficient breadth of interest and activity so that the loss or award of a specific business contract would not be a determining factor in the financial well-being of the agency.~~

~~**9.3.2**~~

~~The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product's ultimate profitability.~~

~~**9.3.3**~~

~~The certification organization shall be accredited for PPE in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services* . The accreditation shall be issued by an accreditation body operating in accordance with ISO/IEC 17011, *Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies* .~~

~~**9.3.4**~~

~~The certification organization shall refuse to certify products to this standard that do not comply with all applicable requirements of this standard.~~

~~**9.3.5***~~

~~The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all applicable requirements of this standard.~~

~~**A.9.3.5**~~

~~The contractual provisions covering a certification program should contain clauses advising the manufacturer that if requirements change, the product should be brought into compliance with the new requirements by a stated effective date through a compliance review program involving all currently listed products.~~

~~Without the clauses, certifiers would not be able to move quickly to protect their name, marks, or reputation. A product safety certification program would be deficient without these contractual provisions and the administrative means to back them up.~~

~~**9.3.5.1**~~

~~The certification organization shall not offer or confer any conditional, temporary, or partial certifications.~~

~~**9.3.5.2**~~

~~Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all applicable requirements of this standard.~~

~~**9.3.6**~~

~~The certification organization shall have laboratory facilities and equipment available for conducting proper tests to determine product compliance.~~

~~**9.3.6.1**~~

~~The certification organization laboratory facilities shall have a program in place and functioning for calibration of all instruments, and procedures shall be in use to ensure proper control of all testing.~~

~~**9.3.6.2**~~

~~The certification organization laboratory facilities shall follow good practice regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.~~

~~**9.3.7**~~

~~The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 9.6 .~~

~~**9.3.7.1***~~

~~The certification organization shall require the manufacturer to have a product recall system specified in Section 9.9 as part of the manufacturer's quality assurance program.~~

~~**A.9.3.7.1**~~

~~Investigative procedures are important elements of an effective and meaningful product safety certification program. A preliminary review should be carried out on products submitted to the agency before any major testing is undertaken.~~

~~**9.3.7.2**~~

~~The certification organization shall audit the manufacturer's quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.~~

~~**9.3.8**~~

~~The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of the compliant product to determine its continued certification to this standard.~~

~~**9.3.9***~~

~~The certification organization shall have a follow-up inspection program of the manufacturing facility's compliant product with at least two random and unannounced visits per 12-month period to verify the product's continued compliance. Where portions of the production process are carried out by multiple facilities, the certification organization shall determine the appropriate follow-up program according to which facility(ies) most closely meets the definition provided in 3.3.105 .~~

~~**A.9.3.9**~~

~~Such inspections should include, in most instances, witnessing of production tests. With certain products, the certification organization inspectors should select samples from the production line and submit them to the main laboratory for countercheck testing. With other products, it could be desirable to purchase samples in the open market for test purposes.~~

~~**9.3.9.1**~~

~~As part of the follow-up inspection program, the certification organization shall select sample compliant product at random from the manufacturing facility's production line, from the manufacturer's or manufacturing facility's in-house stock, or from the open market.~~

~~9.3.9.2~~

~~Sample product shall be evaluated by the certification organization to verify the product's continued compliance in order to assure that the materials, components, and manufacturing quality assurance systems are consistent with the materials, components, and manufacturing quality assurance that were inspected and tested by the certification organization during certification and recertification.~~

~~9.3.9.3~~

~~The certification organization shall be permitted to conduct specific testing to verify the product's continued compliance.~~

~~9.3.9.4~~

~~For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown the result to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of the sample products, components, and materials acquired in accordance with 9.3.9.1 against the applicable requirements of this standard.~~

~~9.3.10~~

~~The certification organization shall have in place a series of procedures, as specified in Section 9.7 , that address report(s) of situation(s) in which a compliant product is subsequently found to be hazardous.~~

~~9.3.11~~

~~The certification organization's operating procedures shall provide a mechanism for the manufacturer to appeal decisions. The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.~~

~~9.3.12~~

~~The certification organization shall be in a position to use legal means to protect the integrity of its name and label. The name and label shall be registered and legally defended.~~

~~9.4~~ ~~Inspection and Testing.~~

~~9.4.1~~

~~For both initial certification and recertification of protective ensembles and ensemble elements, the certification organization shall conduct both inspection and testing as specified in this section.~~

~~9.4.2~~

~~All inspections, evaluations, conditioning, and testing for certification or for recertification shall be conducted by a certification organization's testing laboratory that is accredited in accordance with the requirements of ISO/IEC 17025,~~ ~~*General requirements for the competence of calibration and testing laboratories*~~ ~~.~~

~~9.4.2.1~~

~~The certification organization's testing laboratory's scope of accreditation to ISO/IEC 17025,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ ~~, shall encompass testing of personal protective equipment.~~

~~9.4.2.2~~

~~The accreditation of a certification organization's testing laboratory shall be issued by an accreditation body operating in accordance with ISO/IEC 17011,~~ ~~*Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*~~ ~~.~~

~~9.4.3~~

~~A certification organization shall be permitted to utilize conditioning and testing results conducted by a product or component manufacturer for certification or recertification provided the manufacturer's testing laboratory meets the requirements specified in 9.4.3.1 through 9.4.3.5 .~~

~~9.4.3.1~~

~~The manufacturer's testing laboratory shall be accredited in accordance with the requirements of ISO/IEC 17025,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ ~~.~~

~~9.4.3.2~~

~~The manufacturer's testing laboratory's scope of accreditation to ISO 17025,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ ~~, shall encompass testing of personal protective equipment.~~

~~9.4.3.3~~

~~The accreditation of a manufacturer's testing laboratory shall be issued by an accreditation body operating in accordance with ISO/IEC 17011,~~ ~~*Conformity assessment — General requirements for accreditation bodies accrediting conformity assessment bodies*~~ ~~.~~

~~9.4.3.4~~

~~The certification organization shall approve the manufacturer's testing laboratory.~~

~~9.4.3.5~~

~~The certification organization shall determine the level of supervision and witnessing of the conditioning and testing for certification or recertification conducted at the manufacturer's testing laboratory.~~

~~9.4.4~~

~~Sampling levels for testing and inspection shall be established by the certification organization and the manufacturer to ensure a reasonable and acceptable reliability at a reasonable and acceptable confidence level that products certified to this standard are compliant, unless such sampling levels are specified herein.~~

~~9.4.5~~

~~Inspection by the certification organization shall include a review of all product labels to ensure that all required label attachments, compliance statements, certification statements, and other product information are at least as specified for the protective clothing element or item.~~

~~9.4.6~~

~~Inspection by the certification organization shall include an evaluation of any symbols and pictorial representations used on product labels or in user information, as permitted by 10.1.5 , to ensure that the symbols are clearly explained in the product's user information package.~~

~~9.4.7~~

~~Inspection by the certification organization shall include a review of the user information required by Section 10.2 to ensure that the information has been developed and is available.~~

~~9.4.8~~

~~Inspection by the certification organization for determining compliance with the design requirements specified in Chapter 11 shall be performed on whole or complete products.~~

~~9.4.9~~

~~Testing to determine product compliance with the performance requirements specified in Chapter 12 shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 13 .~~

~~9.4.9.1~~

~~Testing shall be performed on specimens representative of materials and components used in the actual construction of the protective ensemble and ensemble element.~~

~~**9.4.9.2**~~

~~The certification organization also shall be permitted to use sample materials cut from a representative product.~~

~~**9.4.10**~~

~~The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product's submission for evaluation and testing by the certification organization.~~

~~**9.4.11**~~

~~The certification organization shall not allow the substitution, repair, or modification, other than as specifically permitted herein, of any product or any product component during testing.~~

~~**9.4.12**~~

~~The certification organization shall not allow test specimens that have been conditioned and tested for one method to be reconditioned and tested for another test method unless specifically permitted in the test method.~~

~~**9.4.13**~~

~~The certification organization shall test ensemble elements with the specific ensemble(s) with which they are to be certified.~~

~~**9.4.14**~~

~~Any change in the design, construction, or material of a compliant product shall necessitate new inspection and testing to verify compliance to all applicable requirements of this standard that the certification organization determines can be affected by such change. This recertification shall be conducted before labeling the modified product as being compliant with this standard.~~

~~**9.4.15**~~

~~The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the certification of the manufacturer's compliant product. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.~~

~~**9.4.16**~~

~~To facilitate the provision of compliance data from the manufacturer to the purchaser or the authority having jurisdiction, the certification organization shall provide a comprehensive report that provides all design and performance inspection and test data demonstrating compliance of the ensemble or ensemble element with the respective requirements of the standard. The report shall include a summary table indicating the minimum performance requirements of this standard that apply to the specific ensemble or ensemble element in addition to observations or measured values as required to be reported by the test method. The data shall be based on the initial certification data for the product using full replicate data.~~

~~**9.4.17**~~

~~The certification organization shall be permitted to omit certain performance data if the data are contained in separate reports for individual materials, components, or parts of the ensembles or ensemble elements shared by multiple ensembles or ensemble elements. The omission of the performance data shall be permitted when references are made to the separate reports as part of the comprehensive report described in 4.3.16. The separate reports shall include summary tables indicating the minimum performance requirements of this standard that apply to that specific individual materials, components, or parts of the ensemble or ensemble element in addition to observations or measured values as required to be reported by the test method.~~

~~**9.5** Annual Verification of Product Compliance.~~

~~9.5.1~~

~~All individual elements of the protective ensemble that are labeled as being compliant with this standard shall, on an annual basis, undergo recertification that shall include the following *(see Table 9.5.1)* :~~

~~Inspection and evaluation to all design requirements as required by this standard on all manufacturer models and components~~

~~Testing applied to all tests with a pass/fail requirement in the absence of numerical results~~

~~Testing only to those requirements for protective ensembles, ensemble elements, clothing and equipment items, materials, or components where the quantitative results are 150 percent less than the specified criteria~~

~~Testing to all performance requirements as required by this standard on all manufacturer models and components within the following protocol:~~

~~Where a test method incorporates testing both before and after the laundering condition specified in 13.1.3 and the test generates quantitative results, recertification testing shall be limited to the conditioning that yielded the worst-case test result during the initial certification for the model or component.~~

~~Where a test method requires the testing of five or more specimens, a minimum of two specimens shall be tested for annual recertification.~~

~~Where a test method requires the testing of three specimens, a minimum of one specimen shall be tested for annual recertification.~~

~~Where a test method incorporates testing both before and after the laundering condition specified in 13.1.3 and the test generates nonquantitative results, recertifications shall be limited to a single conditioning procedure in any given year. Subsequent annual recertifications shall cycle through the remaining conditioning procedures to ensure that all required conditionings are included over time.~~

~~Table 9.5.1 Initial Certification and Annual Recertification~~

~~**Product Conditioning**~~	~~**Test/Section Number**~~	-	~~**Samples for Conditioning**~~
~~Single-use emergency medical garments and ensembles~~	~~Design Requirements (Section 21.1)~~	-	~~Garment~~
	~~Liquidtight Integrity Test One (Section 8.2)~~	-	~~Garment~~
-	~~Biopenetration Test One (Section 23.3)~~	-	~~Garment~~
-	~~Burst Strength (Section 23.5)~~	-	~~Initial certification: garment~~
-	~~Puncture Propagation Tear Resistance Test (Section 23.6)~~	-	~~Garment~~
-	~~Seam Breaking Strength Test (Section 23.8)~~	-	~~Garment~~
-	~~Moisture Vapor Transmission Rate Test (Section 23.28)~~	-	~~1 m^2 (10.7 ft^2) of composite materials~~
-	~~Flammability Test (Section 23.39)~~	-	~~Garment~~
-	~~Overall Function and Integrity (Section 23.40)~~	-	~~Garment~~
~~Multiple-use emergency medical garments~~	~~Design Requirements (Section 21.1)~~	-	~~Garment~~

~~Product Conditioning~~	~~Test/Section Number~~	-	~~Samples for Conditioning~~
	~~Liquidtight Integrity Test One (Section 23.2)~~	-	~~Garment~~
-	~~Biopenetration Test One (Section 23.3)~~	-	~~Garment barrier layer and seams~~
-	~~Tensile Strength Test (Section 23.4)~~	-	~~Garments or 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Burst Strength (Section 23.5)~~	-	~~Garments or 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Puncture Propagation Tear Resistance Test (Section 23.6)~~	-	~~Garments or 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Tear Resistance Test One (Section 23.7)~~	-	~~Garments or 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Seam Breaking Strength Test (Section 23.8)~~	-	~~Garment seams~~
-	~~Water Absorption Resistance Test (Section 23.31)~~	-	~~Garments or 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Total Heat Loss Test (Section 23.32)~~	-	~~1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Evaporative Resistance (Section 23.42)~~	-	~~1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Label Durability and Legibility Test (Section 23.33)~~	-	~~Labels applied to 1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Corrosion Resistance Test (Section 23.22)~~	-	~~Complete hardware items~~
-	~~Flammability Test (Section 23.39)~~	-	~~1 m ^{2} (10.7 ft ^{2}) of composite materials~~
-	~~Visor Drop Ball Impact Resistance (Section 23.41)~~	-	~~Visors or visor material~~
-	~~Fastener Tape Strength (Section 23.39)~~	-	~~Fastener tape~~
-	~~Overall Function and Integrity (Section 23.40)~~	-	~~Garment~~
~~Single-use emergency medical examination gloves~~	~~Design Requirements (Section 21.2)~~	-	~~Gloves~~
	~~Liquidtight Integrity Test Two (Section 23.9)~~	-	~~Gloves~~
-	~~Biopenetration Test Two (Section 23.10)~~	-	~~Gloves~~
-	~~Ultimate Tensile Strength Test (Section 23.11)~~	-	~~Gloves~~
-	~~Ultimate Elongation Test (Section 23.12)~~	-	~~Gloves~~
-	~~Puncture Resistance Test One (Section 23.13)~~	-	~~Gloves~~
-	~~Dexterity Test One (Section 23.14)~~	-	~~Gloves~~

~~Product Conditioning~~	~~Test/Section Number~~	-	~~Samples for Conditioning~~
-	~~Protein Content Test (Section 23.15)~~	-	~~Gloves~~
~~Single-use emergency medical cleaning/utility gloves~~	~~Design Requirements (Section 23.2)~~	-	~~Gloves~~
	~~Liquidtight Integrity Test Two (Section 23.9)~~	-	~~Gloves~~
-	~~Biopenetration Test Two (Section 23.10)~~	-	~~Gloves~~
-	~~Chemical Permeation Resistance Test (Section 23.24)~~	-	~~Glove barrier materials~~
-	~~Ultimate Tensile Strength Test (Section 23.11)~~	-	~~Gloves~~
-	~~Puncture Resistance Test One (Section 23.13)~~	-	~~Gloves or glove composite swatches~~
-	~~Cut Resistance Test (Section 23.18)~~	-	~~Gloves or glove composite swatches~~
-	~~Abrasion Resistance Test Two (Section 23.25)~~	-	~~Gloves or glove composite swatches~~
-	~~Dexterity Test Two (Section 23.26)~~	-	~~Gloves~~
-	~~Tactility Test (Section 23.30)~~	-	~~Gloves~~
-	~~Flammability Test (Section 23.39)~~	-	~~Gloves or glove composite swatches~~
~~Multiple-use emergency medical work gloves~~	~~Design Requirements (Section 21.2)~~	-	~~Gloves~~
	~~Overall Liquid Integrity Test Three (Section 23.29)~~	-	~~Gloves~~
-	~~Biopenetration Test One (Section 23.3)~~	-	~~Gloves or glove composite swatches~~
-	~~Puncture Resistance Test One (Section 23.13)~~	-	~~Gloves or glove composite swatches~~
-	~~Cut Resistance Test (Section 23.18)~~	-	~~Gloves or glove composite swatches~~
-	~~Abrasion Resistance Test Two (Section 23.25)~~	-	~~Gloves or glove composite swatches~~
-	~~Dexterity Test Two (Section 23.26)~~	-	~~Gloves~~
-	~~Torque Test (Section 23.27)~~	-	~~Gloves~~
-	~~Tactility Test (Section 23.30)~~	-	~~Gloves~~
-	~~Corrosion Resistance Test (Section 23.22)~~	-	~~Complete hardware items~~
-	~~Flammability Test (Section 23.39)~~	-	~~Gloves or glove composite swatches~~
~~Single-use emergency medical facemasks~~	~~Design Requirements (Section 21.3)~~	-	~~Facemasks~~
	~~ASTM F2100~~	-	~~Per ASTM F2100~~
-	~~Liquidtight Integrity Test Three (Section 23.17)~~	-	~~Facemasks~~
~~Single-use emergency medical eye and face protection devices~~	~~Design Requirements (Section 21.3)~~	-	~~Eye and face protection devices~~

~~Product Conditioning~~	~~Test/Section Number~~	-	~~Samples for Conditioning~~
	~~Biopenetration Test One (Section 23.3)~~	-	~~Eye and face protection devices~~
-	~~Liquidtight Integrity Test Three (Section 23.17)~~	-	~~Eye and face protection devices~~
-	~~Visual Acuity/Fogging Resistance (Section 23.16)~~	-	~~Eye and face protection devices~~
-	~~Flammability Test (Section 23.39)~~	-	~~Eye and face protection devices~~
~~Multiple-use emergency medical eye and face protection devices~~	~~Design Requirements (Section 21.3)~~	-	~~Eye and face protection devices~~
	~~ANSI/ISEA Z87.1~~	-	~~Per ANSI/ISEA Z87.1~~
-	~~Liquidtight Integrity Test Three (Section 23.17)~~	-	~~Eye and face protection devices~~
-	~~Corrosion Resistance Test (Section 23.22)~~	-	~~Complete hardware items~~
~~Single-use emergency medical footwear covers~~	~~Design Requirements (Section 21.4)~~	-	~~Footwear covers~~
	~~Biopenetration Test One (Section 23.3)~~	-	~~Footwear covers~~
-	~~Tensile Strength Test (Section 23.4)~~	-	~~Footwear covers~~
-	~~Burst Strength Test (Section 23.5)~~	-	~~Footwear covers~~
-	~~Tear Resistance Test Two (Section 23.38)~~	-	~~Footwear covers~~
-	~~Seam Breaking Strength (Section 23.8)~~	-	~~Footwear covers~~
-	~~Abrasion Resistance Test Two (Section 23.25)~~	-	~~Footwear covers or composite swatches~~
-	~~Puncture Resistance Test One (Section 23.13)~~	-	~~Footwear covers~~
-	~~Slip Resistance Test (Section 23.20)~~	-	~~Outermost layer of the footwear cover wear surface~~
-	~~Flammability Test (Section 23.39)~~	-	~~Footwear cover~~
~~Multiple-use emergency medical footwear~~	~~Design Requirements (Section 23.4)~~	-	~~Footwear~~
	~~Cut Resistance Test (Section 23.18)~~	-	~~Footwear composite swatches~~
-	~~Puncture Resistance Test One (Section 23.13)~~	-	~~Footwear composite swatches~~
-	~~Abrasion Resistance Test One (Section 23.19)~~	-	~~Footwear soles~~
-	~~Slip Resistance Test (Section 23.20)~~	-	~~Footwear~~
-	~~Eyelet and Stud Post Attachment Test (Section 23.21)~~	-	~~Footwear~~
-	~~Corrosion Resistance (Section 23.22)~~	-	~~Complete hardware items~~

~~Product Conditioning~~	~~Test/Section Number~~	~~Samples for Conditioning~~
	~~Biopenetration Test One (Section 23.3)~~	~~Footwear or footwear composite swatches~~
	~~Overall Liquid Integrity Test Four (Section 23.23)~~	~~Footwear~~

~~9.5.2~~

~~Samples of manufacturer models and components for recertification acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up inspection program in accordance with 9.2.9 shall be permitted to be used toward annual recertification.~~

~~9.5.3~~

~~The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the recertification of manufacturer models and components. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.~~

~~9.6~~ ~~Manufacturer's Quality Assurance Program.~~

~~9.6.1~~

~~The manufacturer shall provide and operate a quality assurance program that meets the requirements of this section and that includes a product recall system as specified in 19.2.7.1 and Section 9.9 .~~

~~9.6.2~~

~~The operation of the quality assurance program shall evaluate and test compliant product production to the requirements of this standard to assure production remains in compliance.~~

~~9.6.3*~~

~~The following entities shall either be registered to ISO 9001, *Quality management systems — Requirements* , or be listed as a covered location under an ISO 9001–registered entity:~~

- ~~Manufacturer~~
- ~~Manufacturing facility~~
- ~~Entity directing and controlling compliant product design~~
- ~~Entity directing and controlling compliant product quality assurance~~
- ~~Entity providing the warranty for the compliant product~~
- ~~Entity putting their name on the product label and marketing and selling the product as their own~~

~~A.9.6.3~~

~~In September 2015, a revised edition of ISO 9001, *Quality management systems — Requirements* , was issued. Both the 2008 and 2015 editions of ISO 9001 are referenced in this edition of NFPA 1999 to allow manufacturers sufficient time to transition their quality management systems registration to this new edition.~~

~~9.6.4*~~

~~Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all subcontractor facilities shall be documented, and the documentation shall be provided to the manufacturer's ISO registrar and the certification organization.~~

~~**A.9.6.4**~~

~~Subcontractors should be considered to be, but not be limited to, a person or persons, or a company, firm, corporation, partnership, or other organization having an agreement with or under contract with the compliant product manufacturer to supply or assemble the compliant product or portions of the compliant product.~~

~~**9.7** Hazards Involving Compliant Product.~~

~~**9.7.1***~~

~~The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity* , and as modified herein.~~

~~**A.9.7.1**~~

~~ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity* , is a component of accreditation of certification organizations specified in 9.1.3 and 9.2.3 . Those paragraphs contain mandatory reference to ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services* , in which ISO Guide 27 is referenced.~~

~~**9.7.2***~~

~~Where a report of a hazard involved with a compliant product is received by the certification organization, the validity of the report shall be investigated.~~

~~**A.9.7.2**~~

~~By definition, a hazard could involve a condition that can be imminently dangerous to the end user. With this thought in mind, the investigation should be started immediately and completed in as timely a manner as is appropriate considering the particulars of the hazard being investigated.~~

~~**9.7.3**~~

~~With respect to a compliant product, a hazard shall be a condition or create a situation that results in exposing life, limb, or property to an imminently dangerous or dangerous condition.~~

~~**9.7.4**~~

~~Where a specific hazard is identified, the determination of the appropriate action for the certification organization and the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.~~

~~**9.7.5**~~

~~Where it is established that a hazard is involved with a compliant product, the certification organization shall determine the scope of the hazard, including products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.~~

~~**9.7.6**~~

~~The certification organization’s investigation shall include, but not be limited to, the extent and scope of the problem as it might apply to other compliant products or compliant product components manufactured by other manufacturers or certified by other certification organizations.~~

~~**9.7.7**~~

~~The certification organization shall also investigate reports of a hazard where a compliant product is gaining widespread use in applications not foreseen when the standard was written, such applications in turn being ones for which the product was not certified, no specific scope of application has been provided in the standard, and no limiting scope of application was provided by the manufacturer in written material accompanying the compliant product at the point of sale.~~

~~**9.7.8**~~

~~The certification organization shall require the manufacturer of the compliant product, or the manufacturer of the compliant product component if applicable, to assist the certification organization in the investigation and to conduct its own investigation as specified in Section 9.8 .~~

~~**9.7.9**~~

~~Where the facts indicating a need for corrective action are conclusive and the certification organization's appeal procedures referenced in 9.2.11 have been followed, the certification organization shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.~~

~~**9.7.10**~~

~~Where the facts are conclusive and corrective action is indicated, but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or the manufacturer is bankrupt, the certification organization shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.~~

~~**9.7.11***~~

~~Where the facts are conclusive and corrective action is indicated, the certification organization shall take one or more of the following corrective actions:~~

1. ~~Notification of parties authorized and responsible for issuing a safety alert when, in the opinion of the certification organization, such a notification is necessary to inform the users.~~
2. ~~Notification of parties authorized and responsible for issuing a product recall when, in the opinion of the certification organization, such a recall is necessary to protect the users.~~
3. ~~Removal of the mark of certification from the product.~~
4. ~~Where a hazardous condition exists and it is not practical to implement 9.7.11 (1), 9.7.11 (2), or 9.7.11 (3), or the responsible parties refuse to take corrective action, the certification organization shall notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.~~

~~**A.9.7.11**~~

~~The determination of the appropriate corrective action for the certification organization to initiate should take into consideration the severity of the product hazard and its potential consequences to the safety and health of end users. The scope of testing and evaluation should consider, among other things, testing to the requirements of the standard to which the product was listed as compliant; the age, type of use, and conditions to which the compliant product has been exposed; care and maintenance that has been provided; the use of expertise on technical matters outside the certification organization's area of competence; and product hazards caused by circumstances not anticipated by the requirements of the applicable standard. As a guideline for determining between a safety alert and a product recall, the following product hazard characteristics are provided. These characteristics are based on 42 CFR 84, Subpart E, §84.41:~~

~~*Critical.* A product hazard that judgment and experience indicate is likely to result in a condition immediately hazardous to life or health (IHLH) for individuals using or depending on the compliant product. If an IHLH condition occurs, the user will sustain, or will be likely to sustain, an injury of a severity that could result in loss of life, or resultant significant bodily injury or loss of bodily function, either immediately or at some point in the future.~~

~~*Major A* . A product hazard, other than Critical, that is likely to result in failure to the degree that the compliant product does not provide any protection or reduces protection, and is not detectable to the user. The term *reduces protection* means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is likely to cause physical harm to the user, or where continued degradation could lead to IHLH conditions.~~

~~*Major B* . A product hazard, other than Critical or Major A, that is likely to result in reduced protection, and is detectable to the user. The term *reduces protection* means the failure of specific protective design(s) or feature(s) that results in degradation of protection in advance of reasonable life expectancy to the point that continued use of the product is *likely* to cause physical harm to the user, or where continued degradation could lead to IHLH conditions.~~

~~*Minor* . A product hazard, other than Critical, Major A, or Major B, that is not likely to materially reduce the usability of the compliant product for its intended purpose, or a product hazard that is a departure from the established applicable standard and has little bearing on the effective use or operation of the compliant product for its intended purpose.~~

~~Where the facts are conclusive, based on characteristics of the hazard classified as indicated in A.19.6.11(1) through A.19.6.11(4), the certification organization should consider initiating the following corrective actions with the authorized and responsible parties:~~

~~*Critical* product hazard characteristics: product recall~~

~~*Major A* product hazard characteristics: product recall or safety alert, depending on the nature of the specific product hazard~~

~~*Major B* product hazard characteristics: safety alert or no action, depending on the nature of the specific product hazard~~

~~*Minor* product hazard characteristic: no action~~

~~**9.7.12**~~

~~The certification organization shall provide a report to the organization or individual identifying the reported hazardous condition and notify them of the corrective action indicated, or that no corrective action is indicated.~~

~~**9.7.13***~~

~~Where a change to an NFPA standard(s) is felt to be necessary, the certification organization shall also provide a copy of the report and corrective actions indicated to the NFPA, and shall also submit either a public proposal for a proposed change to the next revision of the applicable standard, or a proposed temporary interim amendment (TIA) to the current edition of the applicable standard.~~

~~**A.9.7.13**~~

~~Reports, proposals, and proposed TIAs should be addressed to the technical committee that is responsible for the applicable standard, in care of Standards Administration, NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471.~~

~~**9.8** Manufacturers' Investigation of Complaints and Returns.~~

~~**9.8.1**~~

~~Manufacturers shall provide corrective action in accordance with ISO 9001, *Quality management systems — Requirements* , for investigating written complaints and returned products.~~

~~**9.8.2**~~

~~Manufacturers' records of returns and complaints related to safety issues shall be retained for at least 5 years.~~

~~**9.8.3**~~

~~Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component can constitute a potential safety risk to end users that is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact the certification organization and provide all information about their review to assist the certification organization with their investigation.~~

~~**9.9** Manufacturers' Safety Alert and Product Recall Systems.~~

~~**9.9.1**~~

~~Manufacturers shall establish a written safety alert system and a written product recall system that describes the procedures to be used in the event that it decides, or is directed by the certification organization, to either issue a safety alert or to conduct a product recall.~~

~~**9.9.2**~~

~~The manufacturers' safety alert and product recall system shall provide the following:~~

~~The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls~~

~~A method of notifying all dealers, distributors, purchasers, users, and the NFPA about the safety alert or product recall that can be initiated within a 1-week period following the manufacturer's decision to issue a safety alert or to conduct a product recall, or after the manufacturer has been directed by the certification organization to issue a safety alert or conduct a product recall~~

~~Techniques for communicating accurately and understandably the nature of the safety alert or product recall and, in particular, the specific hazard or safety issue found to exist~~

~~Procedures for removing a product that is recalled and for documenting the effectiveness of the product recall~~

~~A plan for either repairing, replacing, or compensating purchasers for returned product~~

Submitter Information Verification

Committee: FAE-EMS

Submittal Date: Mon Nov 09 11:13:34 EST 2020

Committee Statement

Committee Statement: The NFPA Standards Council approved the technical committee's request to remove NFPA 1999 from the consolidated NFPA 1990 document. This section is being removed as it pertains specifically to NFPA 1999.

Response Message: SR-97-NFPA 1990-2020

Public Comment No. 10-NFPA 1990-2020 [Chapter 9]

Public Comment No. 245-NFPA 1990-2020 [Sections A.9.1.2.1, A.9.1.2.5, A.9.1.3.4, A.9.2.8, A.9.3.1,...]

Public Comment No. 244-NFPA 1990-2020 [Section No. A.9.1.1.8]

Public Comment No. 243-NFPA 1990-2020 [Section No. A.9.1.1.6]

Public Comment No. 242-NFPA 1990-2020 [Section No. A.9.1.1.5]

Public Comment No. 241-NFPA 1990-2020 [Section No. A.9.1.1.3]

Public Comment No. 240-NFPA 1990-2020 [Section No. A.9.1.1.1]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters
6 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Area, James B.

Billings, Lincoln

Bogucki, Sandy

Davis, James E.

Davis, Todd P.

Patrick, Richard W.

Affirmative All

Fithian, William A.

Freeman, Patricia A.

Hickerson, Barry L.

Horowitz, Jason

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Newsom, Amanda H.

Sadtler, Jeff

Stull, Jeffrey O.

Second Revision No. 98-NFPA 1990-2020 [Chapter 10]

10-deleted ~~Product Labeling and Information (NFPA 1999)-DELETED~~

~~**10.1** Product Label Requirements for Emergency Medical Protective Clothing Items.~~

~~**10.1.1** General Product and Package Label Requirements.~~

~~**10.1.1.1**~~

~~All worded portions of the required product and package labels shall be at least in English.~~

~~**10.1.1.2**~~

~~All letters and numbers on product labels and product package labels shall meet the following requirements:~~

~~The compliance statement in 10.1.2.2 , 10.1.3.2 , 10.1.4.2 , 10.1.4.5 , 10.1.5.2 , 10.1.5.5 , 10.1.6.2 , 10.1.7.2 , 10.1.7.5 , 10.1.8.2 , 10.1.8.5 , 10.1.9.2 , 10.1.9.5 , 10.1.10.2 , 10.1.10.5 , 10.1.11.2 , 10.1.12.2 , 10.1.13.2 , 10.1.14.2 , 10.1.14.5 , 10.1.15.2 , and 10.1.16.2 shall be at least 2.5 mm (3⁄32 in.) high.~~

~~The certification organization's symbol shall be at least 6 mm (1⁄4 in.) high.~~

~~The certification organization's name shall be at least 2.5 mm (3⁄32 in.) high.~~

~~All other required labeling information shall be at least 1.6 mm (1⁄16 in.) high.~~

~~**10.1.1.3**~~

~~Symbols and other pictorial graphic representations shall be permitted to be used to supplement worded statements on the product label(s).~~

~~**10.1.1.4**~~

~~Configuration of the product label and attachment of the product label shall not interfere with the legibility of any printed portion of the product label.~~

~~**10.1.1.5**~~

~~Where applicable, multiple label pieces shall be permitted in order to carry all statements and information required to be on the product label; however, all label pieces comprising the entire product label shall be located adjacent to each other.~~

~~**10.1.1.6**~~

~~Where package labels are required, the package product label shall be permanently and conspicuously located on the outside of the package or printed on the package and shall not be removed, obscured, or otherwise mutilated by the opening of the package when the package is opened as intended.~~

~~**10.1.2** Single-Use Emergency Medical Protective Garment Product Label Requirements.~~

~~**10.1.2.1**~~

~~Each garment shall have a product label or labels permanently and conspicuously located inside each garment when the garment is properly assembled with all layers and components in place.~~

~~**10.1.2.2**~~

~~The product label shall have the certification organization's label, symbol, or identifying mark and at least the following statement legibly printed on the product label:~~

~~**"THIS GARMENT IS FOR SINGLE USE ONLY!**~~

~~**THIS GARMENT MEETS THE SINGLE-USE EMERGENCY MEDICAL GARMENT REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.2.3**~~

~~The following information shall also be printed legibly on the product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Garment model and style~~

~~Trace number~~

~~Principal materials of construction, in accordance with the following:~~

~~At least the identification of the fiber or material type of the garment layer(s) shall be listed.~~

~~Generic names of materials shall be permitted to be used.~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.3** Multiple-Use Emergency Medical Protective Garment Product Label Requirements.~~

~~**10.1.3.1**~~

~~Each garment shall have a product label or labels permanently and conspicuously located inside each garment when the garment is properly assembled with all layers and components in place.~~

~~**10.1.3.2**~~

~~The product label shall have the certification organization's label, symbol, or identifying mark and at least the following statement legibly printed on the product label:~~

~~**"THIS GARMENT MEETS THE MULTIPLE-USE EMERGENCY MEDICAL GARMENT REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.3.3**~~

~~The following information shall also be printed legibly on the product label, and lettering shall be at least 1.6 mm (0.06 in.) high:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Garment model and style~~
- ~~Trace number~~
- ~~Principal materials of construction, in accordance with the following:~~
  - ~~At least the identification of the fiber or material type of the garment layer(s) shall be listed.~~
  - ~~Generic names of materials shall be permitted to be used.~~
- ~~Cleaning precautions~~
- ~~Month and year of manufacture, not coded~~
- ~~Size~~

~~**10.1.3.4**~~

~~Where visibility materials are used on garments and the garment meets the requirements of ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* , the product label shall also meet the marking information required by ANSI/ISEA 107.~~

~~**10.1.3.5**~~

~~Where visibility materials are used on garments and are not intended to meet the requirements in ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* , the product label shall include the following warning:~~

~~**"WEARING OF THIS GARMENT ALONG ROADSIDES OR OTHER AREAS WITH VEHICULAR TRAFFIC REQUIRES ADDITIONAL HIGH VISIBILITY SAFETY APPAREL, COMPLIANT WITH AT LEAST THE CLASS 2**~~

~~**REQUIREMENTS OF ANSI/ISEA 107."**~~

~~**10.1.4** Single-Use Emergency Medical Examination Gloves Product Label Requirements.~~

~~**10.1.4.1**~~

~~The package containing the smallest number of glove items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.4.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the package product label:~~

~~**"THIS GLOVE IS FOR SINGLE USE ONLY!**~~

~~**THIS GLOVE MEETS THE SINGLE-USE EMERGENCY MEDICAL EXAMINATION GLOVE REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.4.3**~~

~~The following information shall also be printed legibly on the package product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Glove model and style~~

~~Trace number~~

~~Principal materials of construction (generic names permitted)~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.4.4**~~

~~In addition to the required package product label, each glove shall be permitted to have a product label on the outside of the glove.~~

~~**10.1.4.5**~~

~~Where each glove has a product label, the certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed as the product label on each glove:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.5** Single-Use Emergency Medical Cleaning/Utility Glove Product Label Requirements.~~

~~**10.1.5.1**~~

~~The package containing the smallest number of glove items from which the user withdraws the product for use shall be permitted to have a package product label in place of the package label.~~

~~**10.1.5.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the package product label:~~

~~**"THIS GLOVE IS FOR SINGLE USE ONLY!**~~

~~**THIS GLOVE MEETS THE SINGLE-USE EMERGENCY MEDICAL CLEANING/ UTILITY GLOVE REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS*, 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.5.3**~~

~~The following information shall also be printed legibly on the package product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Glove model and style~~

~~Trace number~~

~~Principal materials of construction (generic names permitted)~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.5.4**~~

~~In addition to the required package product label, each cleaning/utility glove shall be permitted to have a product label on the outside of the glove.~~

~~**10.1.5.5**~~

~~Where each cleaning/utility gloves has a product label, the certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed as the product label on each glove:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.6** Multiple-Use Emergency Medical Work Glove Product Label Requirements.~~

~~**10.1.6.1**~~

~~Each work glove shall have a product label(s) permanently and conspicuously attached inside each glove.~~

~~**10.1.6.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label:~~

~~**"THIS GLOVE MEETS THE MULTIPLE-USE EMERGENCY MEDICAL WORK GLOVE REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.6.3**~~

~~The following information shall also be printed legibly on the product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Glove model and style~~
- ~~Trace number~~
- ~~Principal materials of construction, in accordance with the following:~~
  - ~~Where applicable, at least the outer layer and barrier layer shall be listed.~~
  - ~~Generic names of materials shall be permitted to be used.~~
  - ~~Where applicable, the type of leather shall be listed.~~
  - ~~Additional materials used throughout a significant portion of the glove's construction shall be listed.~~
- ~~Cleaning precautions~~
- ~~Month and year of manufacture, not coded~~
- ~~Size~~

~~**10.1.7** Single-Use Emergency Medical Facemask Product Label Requirements.~~

~~**10.1.7.1**~~

~~The package containing the smallest number of facemask items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.7.2**~~

~~The certification organization’s label, symbol, or identifying mark and at least the following statement shall be legibly printed on the package product label:~~

~~**“THIS FACEMASK IS FOR SINGLE USE ONLY!**~~

~~**THIS MASK MEETS THE SINGLE-USE EMERGENCY MEDICAL FACEMASK REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!”**~~

~~**10.1.7.3**~~

~~The following information shall also be printed legibly on the package product label:~~

- ~~Manufacturer’s name, identification, or designation~~
- ~~Manufacturer’s address~~
- ~~Country of manufacture~~
- ~~Facemask model and style~~
- ~~Trace number~~
- ~~Principal materials of construction (generic names permitted)~~
- ~~Month and year of manufacture, not coded~~
- ~~Size, where applicable~~

~~**10.1.7.4**~~

~~In addition to the required package product label, each mask shall be permitted to have a product label in an area of the facemask that does not affect its function.~~

~~**10.1.7.5**~~

~~Where each facemask has a product label, the certification organization’s label, symbol, or identifying mark and at least the following statement shall be legibly printed as the product label on each facemask:~~

~~**“MEETS NFPA 1999, 2018 ED.”**~~

~~**10.1.7.6**~~

~~Where the medical facemask is not certified by National Institute for Occupational Safety and Health (NIOSH) as a respirator to 42 CFR 84, “Approval of Respiratory Protective Devices,” the package product label shall include the following additional warning:~~

~~**“THIS FACEMASK IS NOT A RESPIRATOR AND WILL NOT PROVIDE RESPIRATORY PROTECTION AGAINST AIRBORNE BIOLOGICAL HAZARDS.”**~~

~~**10.1.8** Single-Use Emergency Medical Eye and Face Protection Device Product Label Requirements.~~

~~**10.1.8.1**~~

~~The package containing the smallest number of eye and face protection device items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.8.2**~~

~~The certification organization’s label, symbol, or identifying mark and at least the following statement shall be legibly printed on the package product label:~~

~~**“THIS {insert name of item} IS FOR SINGLE USE ONLY!**~~

~~**THIS {insert name of item} MEETS THE SINGLE-USE EMERGENCY EYE AND FACE PROTECTION DEVICE REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!”**~~

~~**10.1.8.3**~~

~~The following information shall also be printed legibly on the package product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Eye and face protection device model or style~~

~~Trace number~~

~~Principal materials of construction (generic names permitted)~~

~~Month and year of manufacture, not coded~~

~~Size, where applicable~~

~~**10.1.8.4**~~

~~In addition to the required package product label, each eye and face protection device shall be permitted to have a product label in a location of the eye and face protection device that does not interfere with the wearer's vision or device's function.~~

~~**10.1.8.5**~~

~~Where each eye and face protection device has a product label, the certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed as the product label on each eye and face protection device:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.9** Multiple-Use Emergency Medical Eye and Face Protection Devices Product Label Requirements.~~

~~**10.1.9.1**~~

~~The package containing the smallest number of eye and face protection device items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.9.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be printed on the package product label:~~

~~**"THIS DEVICE MEETS THE MULTIPLE-USE EMERGENCY MEDICAL EYE AND FACE PROTECTION REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS*, 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.9.3**~~

~~The following information also shall be printed legibly on the package product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Eye and face protection device model or style~~

~~Trace number~~

~~Principal materials of construction (generic names permitted)~~

~~Cleaning precautions~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.9.4**~~

~~Each face protection device shall have a product label, in addition to the required package product label, placed in a conspicuous location on the device that shall not interfere with the wearer's vision.~~

~~**10.1.9.5**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label of each multiple-use face protection device:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.10** Single-Use Emergency Medical Footwear Cover Product Label Requirements.~~

~~**10.1.10.1**~~

~~The package containing the smallest number of footwear cover items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.10.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the package product label:~~

~~**"THIS FOOTWEAR COVER IS FOR SINGLE USE ONLY!**~~

~~**THIS FOOTWEAR COVER MEETS THE SINGLE-USE EMERGENCY MEDICAL FOOTWEAR COVER REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS* , 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.10.3**~~

~~The following information shall also be printed legibly on the package product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Footwear cover model or style~~
- ~~Trace number~~
- ~~Principal materials of construction (generic names permitted)~~
- ~~Month and year of manufacture, not coded~~
- ~~Size, where applicable~~

~~**10.1.10.4**~~

~~In addition to the required package product label, each footwear cover shall be permitted to have a product label in area of the footwear cover that does not affect the comfort of the wearer.~~

~~**10.1.10.5**~~

~~Where each footwear cover has a product label, the certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed as the product label on each footwear cover:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.11** Multiple-Use Emergency Medical Footwear Product Label Requirements.~~

~~**10.1.11.1**~~

~~Each footwear item shall have a product label or labels permanently and conspicuously attached inside each footwear item when the footwear is properly donned.~~

~~10.1.11.2~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label:~~

~~"THIS FOOTWEAR MEETS THE MULTIPLE-USE EMERGENCY MEDICAL FOOTWEAR REQUIREMENTS OF NFPA 1999,~~ *~~STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS~~* ~~, 2018 EDITION.~~

~~DO NOT REMOVE THIS LABEL!"~~

~~10.1.11.3~~

~~The following information shall also be printed legibly on the product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Footwear model or style~~
- ~~Trace number~~
- ~~Principal materials of construction, in accordance with the following:~~
  - ~~Where applicable, at least the outer layer and barrier layer shall be listed.~~
  - ~~Generic names shall be permitted to be used.~~
  - ~~Additional materials used throughout a significant portion of the boot's construction shall be listed.~~
- ~~Cleaning precautions~~
- ~~Month and year of manufacture, not coded~~
- ~~Size~~

~~10.1.12~~ ~~Multiple-Use Medical Care Facility Footwear Product Label Requirements.~~

~~10.1.12.1~~

~~Each footwear item shall have a product label or labels permanently and conspicuously attached inside each footwear item when the footwear is properly donned.~~

~~10.1.12.2~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label:~~

~~"THIS FOOTWEAR MEETS THE MULTIPLE-USE MEDICAL CARE FACILITY FOOTWEAR REQUIREMENTS OF NFPA 1999,~~ *~~STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS~~* ~~, 2018 EDITION.~~

~~THIS FOOTWEAR HAS NOT BEEN REQUIRED TO PROVIDE RESISTANCE TO TOE IMPACT AND~~

~~COMPRESSION OR SOLE PUNCTURE!~~

~~DO NOT REMOVE THIS LABEL!"~~

~~10.1.12.3~~

~~The following information shall also be printed legibly on the product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Footwear model or style~~
- ~~Trace number~~
- ~~Principal materials of construction, in accordance with the following:~~
  - ~~Where applicable, at least the outer layer and barrier layer shall be listed.~~
  - ~~Generic names shall be permitted to be used~~
  - ~~Additional materials used throughout a significant portion of the boot's construction shall be listed.~~
- ~~Cleaning precautions~~
- ~~Month and year of manufacture, not coded~~
- ~~Size~~

~~10.1.13~~ ~~Multiple-Use Emergency Medical Helmet Product Labeling Requirements.~~

~~10.1.13.1~~

~~Each helmet shall have a product label or labels permanently and conspicuously attached. At least one product label shall be conspicuously located on or inside each helmet when the helmet is properly assembled with all components in place.~~

~~10.1.13.2~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label:~~

~~"THIS HELMET MEETS THE EMERGENCY MEDICAL HELMET REQUIREMENTS OF NFPA 1999,~~ *~~STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS~~* ~~, 2018 EDITION.~~

~~DO NOT REMOVE THIS LABEL!"~~

~~10.1.13.3~~

~~The following information shall also be printed legibly on the product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Helmet model or style~~
- ~~Trace number~~
- ~~Helmet size or size range~~
- ~~Nominal weight of helmet~~
- ~~Month and year of manufacture, not coded~~
- ~~Cleaning precautions~~

~~10.1.14~~ ~~Emergency Medical Powered Air-Purifying Respirator Product Label Requirements.~~

~~**10.1.14.1**~~

~~The package containing the smallest number of powered air-purifying respirator items from which the user withdraws the product for use shall have a package product label.~~

~~**10.1.14.2**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be printed on the package product label:~~

~~**"THIS RESPIRATOR MEETS THE MULTIPLE-USE EMERGENCY MEDICAL EYE AND FACE PROTECTION REQUIREMENTS OF NFPA 1999, STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS, 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.14.3**~~

~~The following information also shall be printed legibly on the package product label:~~

- ~~Manufacturer's name, identification, or designation~~
- ~~Manufacturer's address~~
- ~~Country of manufacture~~
- ~~Respirator model or style~~
- ~~Trace number~~
- ~~Principal materials of construction (generic names permitted)~~
- ~~Cleaning precautions~~
- ~~Month and year of manufacture, not coded~~
- ~~Size~~

~~**10.1.14.4**~~

~~Each respirator shall have a product label, in addition to the required package product label, placed in a conspicuous location on the respirator that shall not interfere with the wearer's vision.~~

~~**10.1.14.5**~~

~~The certification organization's label, symbol, or identifying mark and at least the following statement shall be legibly printed on the product label of each respirator:~~

~~**"MEETS NFPA 1999, 2018 ED."**~~

~~**10.1.15** Single-Use Emergency Medical Ensemble Product Label Requirements.~~

~~**10.1.15.1**~~

~~The garment portion of the ensemble shall have a product label or labels permanently and conspicuously located inside the garment when the ensemble is properly assembled with all layers and components in place.~~

~~**10.1.15.2**~~

~~The product label shall have the certification organization's label, symbol, or identifying mark and at least the following statement legibly printed on the product label:~~

~~**"THIS ENSEMBLE IS FOR SINGLE USE ONLY! THIS ENSEMBLE MEETS THE SINGLE-USE EMERGENCY MEDICAL ENSEMBLE REQUIREMENTS OF NFPA 1999, STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS, 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.15.3**~~

~~The following information shall also be printed legibly on the product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Ensemble model and style~~

~~Trace number~~

~~Principal materials of construction~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.15.4**~~

~~The following additional language shall be provided on the product label:~~

~~**"TO PROVIDE FULL BODY PROTECTION, THE FOLLOWING ADDITIONAL ITEMS MUST BE WORN AS PART OF THIS ENSEMBLE."**~~

~~**[List items including manufacturer name and model or style number.]**~~

~~**10.1.16** Multiple-Use Emergency Medical Protective Ensemble Product Label Requirements.~~

~~**10.1.16.1**~~

~~The garment portion of the ensemble shall have a product label or labels permanently and conspicuously located inside the garment when the garment is properly assembled with all layers and components in place.~~

~~**10.1.16.2**~~

~~The product label shall have the certification organization's label, symbol, or identifying mark and at least the following statement legibly printed on the product label:~~

~~**"THIS ENSEMBLE MEETS THE MULTIPLE-USE EMERGENCY MEDICAL ENSEMBLE REQUIREMENTS OF NFPA 1999, STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL**~~

~~**OPERATIONS, 2018 EDITION.**~~

~~**DO NOT REMOVE THIS LABEL!"**~~

~~**10.1.16.3**~~

~~The following information shall also be printed legibly on the product label:~~

~~Manufacturer's name, identification, or designation~~

~~Manufacturer's address~~

~~Country of manufacture~~

~~Ensemble model or style~~

~~Trace number~~

~~Principal materials of construction~~

~~Cleaning precautions~~

~~Month and year of manufacture, not coded~~

~~Size~~

~~**10.1.16.4**~~

~~The following additional language shall be provided on the product label:~~

~~**"TO PROVIDE FULL BODY PROTECTION, THE FOLLOWING ADDITIONAL ITEMS MUST BE WORN AS PART OF THIS ENSEMBLE."**~~

~~**[list items including manufacturer name and model or style number.]**~~

~~**10.1.16.5**~~

~~Where visibility materials are used on garments and the garment meets the requirements of ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* , the product label shall also meet the marking information required by ANSI/ISEA 107.~~

~~**10.1.16.6**~~

~~Where visibility materials are used on garments and are not intended to meet the requirements in ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* , the product label shall include the following warning:~~

~~**"WEARING OF THIS ENSEMBLE ALONG ROADSIDES OR OTHER AREAS WITH VEHICULAR TRAFFIC REQUIRES ADDITIONAL HIGH VISIBILITY SAFETY APPAREL, COMPLIANT WITH AT LEAST THE CLASS 2**~~

~~**REQUIREMENTS OF ANSI/ISEA 107."**~~

~~**10.2** User Information.~~

~~**10.2.1**~~

~~The manufacturer shall provide the following instructions and information with each product, as applicable:~~

- ~~Pre-use information~~
  - ~~Safety considerations~~
  - ~~Limitations of use~~
  - ~~Marking recommendations and restrictions~~
  - ~~Statement that most performance properties cannot be tested by the user in the field~~
  - ~~Warranty information~~
- ~~Preparation for use~~
  - ~~Sizing/adjustment~~
  - ~~Recommended storage practices~~
- ~~Inspection frequency and details~~
- ~~Don/doff~~
  - ~~Donning and doffing procedures~~
  - ~~Sizing and adjustment procedures~~
  - ~~Interface issues~~
- ~~Proper use consistent with NFPA 1500 , NFPA 1581 , 29 CFR 1910.132, "Personal Protective Equipment: General Requirements" and 29 CFR 1910.1030, "Bloodborne Pathogens"~~
- ~~Maintenance and cleaning for multiple-use products~~
  - ~~Cleaning instructions and precautions with a statement advising users not to use products that are not thoroughly cleaned and dried~~
  - ~~Inspection details~~
  - ~~Maintenance criteria and methods of repair where applicable~~
  - ~~Retirement criteria and considerations~~
- ~~Decontamination procedures~~
- ~~Disposal criteria and considerations~~

~~**10.2.2***~~

~~For single-use or multiple-use protective ensembles, the following additional instructions and information shall be provided:~~

~~The specific sequence and requirements for donning each item of the ensemble.~~

~~Specific recommended methods for cleaning each element where elements are combined or attached.~~

~~* Specific considerations for decontamination to be employed during the doffing of ensemble elements.~~

~~**A.10.2.2(3)**~~ –

~~The specific considerations for decontamination provided by the manufacturer should take into account the effects of decontamination agents on the ensemble material as these agents can be applied during the doffing process both in terms of any immediate degradation that results in exposure of the wearer or from repeated use of decontamination agents on the ensemble element that compromises the continued service of multiple-use ensemble items. The immediate effects of degradation can be determined by applying the permeation procedures specified in Section 13.24 , where specimens of ensemble materials are exposed to selected decontamination or disinfection agents for a period of 1 hour with the measurement of cumulative permeation. These procedures are currently only applied to single-use emergency medical cleaning gloves. The procedures can be adapted as a precondition using suitable and anticipated decontamination agents followed by biopenetration resistance testing specified in Section 13.3 or the assessment of material physical properties as specified for the individual ensemble element. For example, the burst strength and puncture propagation tear resistance of a garment material (specified in Sections 13.5 and 13.6 , respectively) can be applied both before and after a 1-hour exposure to bleach (5 percent w/w sodium hypochlorite solution in water) to determine if any physical degradation of the garment could take place. If a disinfectant such as bleach is used as the decontamination agent, the conditioned specimen must be thoroughly rinsed prior to biopenetration resistance testing.~~

~~* The specific sequence, precautions, and requirements for doffing each item of the ensemble, when contaminated with body fluids, for the avoidance of cross-contamination of the individual wearer, other ensemble items, and the outside environment.~~

~~**A.10.2.2(4)**~~ –

~~Contamination of the wearer during the doffing process is a significant hazard that is not readily detected. It is recognized that each organization that used protective ensembles for the protection of their personnel could have unique donning and doffing procedures based on their specific operational or clinical practices. To assess whether the doffing procedures are adequately designed to limit cross contamination, the following practices are recommended:~~

~~The wearer must assume that any surface could be contaminated.~~

~~All doffing must be performed under supervision and with assistance as needed. Individuals supervising or assisting in the decontamination of potentially contaminated personnel should be wearing appropriate protective clothing.~~

~~The last items to be removed should be the face/eye protection or respirator, and inner gloves.~~

~~Any time the wearer of the contaminated ensemble or an individual assisting in the doffing process touches a potentially contaminated surface or PPE item, the wearer or assisting individual must rinse their gloved hands with an appropriate decontamination solution that does not cause degradation of the gloves.~~

~~For some types of ensembles, it is possible to cut off the garment to permit easier doffing without contact with contaminated surfaces. If cutting of the garment is performed, then the procedures used for the cutting process should account for the design of the garment (e.g., the placement of seams and closures). Further, specific cutting equipment should be used that does not pose a physical hazard to the wearer or potential source for the transfer of contamination.~~

~~The specific effectiveness of these procedures can be determined by a practical test where a fluorescently tagged agent acting as a surrogate for contaminated body fluids is applied to exterior of the ensemble in areas of likely contamination with a test subject undertaking specified manufacturer's or organization's doffing procedures. The use of fluorescent (black or UV) of the test subject following the doffing process can qualitatively determine if any contamination transfer has taken place to the wearer. Examples of specific procedures applied for this type of assessment can be found in the following literature:~~

~~Beam, E. L., et al., "A method for evaluating health care workers' personal protective equipment technique." *American Journal of Infection Control* 39, 2011: 415–420.~~

~~Bell, T., et al., "Ebola virus disease: The use of fluorescents as markers of contamination for personal protective equipment." *IDCases* 2.1, 2015: 27–30.~~

~~Casanova, L., et al., "Virus Transfer from Personal Protective Equipment to Healthcare Employee's Skin and Clothing." *Emerging Infectious Diseases* 14.8, 2008: 1291–1293.~~

~~Cherrie, J. W., et al., "Use of Qualitative and Quantitative Fluorescence Techniques to Assess Dermal Exposure." *Annals of Occupational Hygiene* 44.7, 2000:519–522.~~

~~Fenske, R. A., "Visual Scoring System for Fluorescent Tracer Evaluation of Dermal Exposure." *Bulletin of Environmental Contamination and Toxicology* 41, 1988:727–736.~~

~~Guo, Y. P., et al., "Environment and body contamination: a comparison of two different removal methods in three types of personal protective clothing." *American Journal of Infection Control* 42, 2014: pp. e39–e45.~~

~~Pan, Sung Ching, et al., "Assessing the thoroughness of hand hygiene: 'Seeing is believing'." *American Journal of Infection Control* 42.7, 2014: 799–801.~~

~~Zamora, J., et al., "Contamination: A Comparison of 2 Personal Protective Systems."~~ ~~*Canadian Medical Association Journal*~~ ~~175.3, August 1, 2006: 249–254.~~

~~Zellmer, C., S. Van Hoof, and N. Safdar. "Variation in health care worker removal of personal protective equipment."~~ ~~*American Journal of Infection Control*~~ ~~43.7, 2015: 750–751.~~

~~One specific application has found that the use of specific commercial hand-washing aids, when properly diluted, can be sprayed onto clothing using a hand or paint sprayer. Alternatively, the surrogate contaminant can be brushed or swabbed onto areas of the ensemble that are likely to be contaminated. These procedures identify specific surrogate contaminants and methods of detection that could be adapted for the evaluation of specific ensembles. The procedures could also have utility in training of individuals in proper doffing procedures.~~

~~A.10.2.2~~

~~The use of protective ensembles for protection against liquid-borne pathogens requires further information from the manufacturer that describes the order for putting on and taking off ensemble elements and how individual items should be put on and taken off to create and preserve protection to interface areas. Where tape is used as part of single-use ensembles, only specific tapes recommended by the manufacturers should be used and its application should be consistent with detailed manufacturer instructions, including how it is removed. This information is important for avoiding cross-contamination of the individual wearer, ensemble elements, and the environment. When elements are integrated through interfaces, specific instructions should be provided that address whether specific care is needed for cleaning of these items. For example, if gloves are attached, then any variation in the cleaning procedures for this type of interface should be addressed. Similarly, considerations for decontamination of the ensemble should be provided that address any restrictions for how ensemble elements should be decontaminated, such as whether bleach or liquid-based disinfectants should be used. The manufacturer should indicate that their procedures may need to be adapted for specific missions and applications.~~

~~10.2.3*~~

~~The manufacturer shall state the storage life for all single-use and multiple-use protective elements and include the storage life and the basis for recommended storage life as part of the user information.~~

~~A.10.2.3~~

~~Storage life estimates should be generated by the manufacturer for the ensemble based on the manufacturer's recommended storage guidelines. Manufacturers might generate storage life estimates from various methods since different elements, materials, and components used in the construction of the ensemble might require different test methods or parameters. This is because one test method with one set of parameters will not represent all ensemble elements, materials, and components across all manufacturers equally and could be design restrictive. The manufacturer should be offered the flexibility to choose from a variety of test methods and criteria to best represent the real-world storage scenario(s) for the specific product and its components.~~

~~*Identification of Limiting Elements, Materials, and Components.*~~ ~~When establishing a storage life, the manufacturer should first identify the element(s), material(s), or component(s) of the ensemble that would likely have the shortest storage life, and base the ensemble storage life on the performance of that limiting component(s). A failure modes and effects analysis (FMEA) for the entire ensemble can be conducted to identify the element(s), material(s), and component(s) that warrants storage life testing. Ensemble elements, materials, and components that should be considered include, but are not limited to, the following:~~

~~Base suit material~~

~~Visor material~~

~~Gloves~~

~~Footwear~~

~~Seaming materials (e.g., tape, adhesives, thread)~~

~~Closures (e.g., zippers, multi-track closures, snaps, hook and loop tape)~~

~~Elastomeric or other types of interface materials~~

~~Exhaust valves~~

~~External fittings~~

~~Installed plastic parts (e.g., buckles)~~

~~Other ensemble components (e.g., webbing, internally installed air distribution systems)~~

~~The FMEA should consider that certain ensemble elements, materials, and components can comprise individual pieces that have different susceptibility to aging and degradation. For example, an exhaust valve might have a plastic housing, plastic cover, plastic securing ring, an elastomeric diaphragm, and elastomeric gaskets.~~

~~Strategies that should be considered to estimate storage life include, but are not limited to, the following:~~

~~Evaluation of existing ensembles that have been stored in known environments for specific durations (e.g., 5 years, 10 years, 15 years)~~

~~Accelerated aging testing~~

~~Use of specific aging or storage life information obtained from other sources for individual or analogous ensemble elements, materials, and components~~

~~*End-Use Parameters to Consider Testing Following Storage Life Testing.*~~ ~~Regardless of the strategy used to determine storage life, the manufacturer should test specific ensembles or ensemble elements, materials, or components against a standardized list of end-use performance criteria from the applicable NFPA standard. The age at which the limiting ensemble elements, materials, or components fail to meet NFPA's performance specification sets the maximum storage life. If accelerated aging testing is conducted, the aged samples should be validated to represent real-world storage aging. The following parameters should be considered:~~

~~Material mechanical properties: burst strength, puncture propagation tear resistance, tear resistance, or tensile strength~~

- ~~Garment functionality, seam integrity, or seam strength~~
- ~~Viral penetration following laundry for multiple use and out of package for single use~~

~~The following example is sourced from the National Research Council's "Accelerated Aging of Materials and Structures: The Effects of Long-Term Elevated-Temperature Exposure."~~

~~In the 1990s, NASA commissioned the National Materials Advisory Board (NMAB) to develop an approach to determine the service life durability of materials in high-performance aircraft. While the application is slightly different, the approach serves as a good example model that can be used for NFPA 1990. The approach is as follows according to the report from NMAB:~~

~~"The committee believes that an approach based on a more fundamental understanding of materials response, degradation methods, and models and simulations using validated accelerated test methods will lead to increased confidence in aging predictions. In this light, the committee has recommended such an approach to aging characterization and has identified the critical research and data needs."~~

~~"The committee recommends that, regardless of the material or application, the fundamental approach to the characterization of aging behavior should be the same. The approach that the committee recommends involves five steps. These steps are the basis for organizing the committee's conclusions and recommendations. The steps required to characterize the aging responses of materials and the evaluation of structures include defining the service [storage] environment, identifying probable degradation or failure mechanisms [limiting components], characterizing the materials aging responses using accelerated methods and analytical models, using text and model results to analyze and understand aging in structural components [ensembles], and validating predictions [real-world aged garment comparison]."~~

~~*Accelerated Aging Testing.* Several different test methods are used to conduct accelerated aging. Most accelerated aging testing involves elevated temperatures and the Arrhenius equation. It is very important for the manufacturer to understand and stay below any material transition (i.e., degradation) temperatures during elevated temperature testing. These secondary degradation mechanisms might not be representative of real-world aging and could result in shorter-than-realistic storage life estimates. Furthermore, the manufacturer should take caution when testing full ensembles or composites of multiple materials because the off-gassing from one component could adversely affect another component in a nonrepresentative manner. This type of exploratory testing can be conducted with basic analytical testing such as dynamic mechanical analysis (DMA) or differential scanning calorimetry (DSC).~~

~~As indicated earlier, different ensembles comprising different elements, materials, and components will see different dominant modes of degradation. Various standards should be investigated so that the specific failure mode of interest can be tested and verified.~~

~~The following documents should be considered for aging methods:~~

- ~~ASTM F1980, *Standard Guide for Accelerated Aging of Sterile Barrier Systems for Medical Devices* : This method uses elevated temperatures; however, it recommends not testing over 60°C (140°F) in order to minimize secondary degradation mechanisms. This method allows for aging of an entire garment and gives an approximation of the deterioration of the entire system.~~
- ~~ASTM D3045, *Standard Practice for Heat Aging of Plastics Without Load* : This method only uses hot air. This method evaluates one end-use parameter (e.g., tensile strength) after aging the material at different temperatures and for different exposure lengths. This method is best at product comparisons, but can be used to give an estimate for storage life.~~
- ~~DLAR (JP) 4155.37, "Department of Defense (DoD) Shelf Life Material Quality Control Storage Standards."~~
- ~~MIL-STD-810G, *Environmental Engineering Considerations and Laboratory Tests* : While this standard does not predict storage life or perform accelerated aging, it does identify a range of different environmental conditions that can aid in establishing storage life testing conditions.~~

~~ASTM D572, *Standard Test Method for Rubber — Deterioration by Heat and Oxygen* . This method does not result in a storage life estimation, and is best used to do product comparisons.~~

~~ASTM D573, *Standard Test Method for Rubber — Deterioration in an Air Oven* . This test method is similar to ASTM D572 except the test oven is not pressured and uses air. The test reports a percentage decrease in performance of an end-use parameter. This method does not claim to relate to a real-world time scale and is best used for product comparison.~~

~~ISO 2440, *Flexible and rigid cellular polymeric materials — Accelerated ageing tests* . This test method is similar to ASTM D572 and ASTM D573 in that it does not directly relate to storage life and the results are reported with aging conditions and the percent decrease of a property of interest. However, it does target both hydrolysis and oxidation and gives temperatures and humidity level recommendations to test under.~~

~~Note that it is especially important to validate an accelerated aging testing and model with real-world aged garments that were stored under the conditions specified by the manufacturer.~~

~~*Predicted Accelerated Aging Claim with No Real-World Aging Validation.* For products with no real-world aging results to validate accelerated aging models (e.g., a new product), the storage life should be indicated as either a predicted storage life or non-validated storage life based on a predicted accelerated aging claim. Certified garments should be set aside and evaluated to meet the testing or evaluation model approach at one-half of the stated storage life.~~

~~Like all laboratory tests, the results of accelerated aging might not be predictive of all real-world results but are potential indicators/metrics for helping end users and buying agencies make comparative choices.~~

~~**10.2.3.1**~~

~~When establishing a storage life, the manufacturer shall determine the element(s), material(s), or component(s) of the ensemble that has the shortest storage life, excluding replaceable components, and set the ensemble storage life based on the limiting component(s).~~

~~**10.2.3.2**~~

~~When applicable, the manufacturer shall identify replaceable components and elements with a storage life less than the stated ensemble storage life and indicate the required replacement frequency.~~

~~**10.2.4**~~

~~When the manufacturer makes a breathability claim for a full garment or ensemble, the garment or ensemble shall be tested as specified in Section 13.32 and the results of the testing shall be reported in the technical data package.~~

~~**10.3** Technical Data Package.~~

~~**10.3.1**~~

~~The manufacturer shall furnish a technical data package for single-use or multiple-use protective ensembles and ensemble elements upon the request of the purchaser.~~

~~**10.3.1.1***~~

~~The technical data package shall contain all documentation required by this standard and the specific test results or values obtained from the initial certification showing compliance with the requirements of Chapter 12 in the current edition of this standard using the reporting formats provided in Table 10.3.1.1(a) and Table 10.3.1.1(b) . The technical data package information shall indicate “Pass” for those requirements where there is no quantitative value reported and “Not applicable” for specific requirements that do not apply to the emergency medical ensemble.~~

~~Table 10.3.1.1(a) Format for Reporting NFPA 1999–Compliant Certification Test Data in Technical Data Package~~

~~**Ensemble or Element**~~	~~**Performance Requirement**~~	~~**Test Method**~~	~~**Requirement**~~	~~**Result**~~
~~***Single-Use Emergency Medical Garment***~~				
~~Garment~~	~~Liquidtight integrity test one~~	~~ASTM F1359/F1359M (Section 8.2)~~	~~No liquid penetration~~	-
-	~~Overall ensemble function~~	~~ASTM F1154, modified (Section 8.40)~~	~~Complete tasks in ≤ 20 min with garment closure remaining engaged~~	-
-	-	-	~~Test subject properly identifies 3 out of 4 numbers on NFPA 704 placard at each angle~~	-
-	-	-	~~Visual acuity ≥ 20/35~~	-
-	-	-	~~Protective flap remains closed over closure system~~	-
~~Garment material~~	-	-	~~No liquid penetration following exercises~~	-
-	~~Burst strength~~	~~ASTM D3787 (Section 8.5)~~	~~≥66 N (≥14.9 lbf)~~	-
-	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.6)~~	~~≥12 N (≥2.7 lbf)~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
-	~~Moisture vapor transmission rate~~	~~Procedure B of ASTM E96/E96M (Section 8.28)~~	~~≥650 g/m^{2} /24 hours~~	-
~~Seams~~	~~Biopenetration test one~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Seam breaking strength~~	~~ASTM D1683/D1683M (Section 8.8)~~	~~≥50 N (≥11.2 lbf)~~	-
~~Visors~~	~~Burst strength~~	~~ASTM D3787 (Section 8.5)~~	~~≥66 N (≥14.9 lbf)~~	-
-	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.6)~~	~~≥12 N (≥2.7 lbf)~~	-
~~***Multiple-Use Emergency Medical Garment***~~				
~~Garment~~	~~Liquidtight integrity~~	~~ASTM F1359/F1359M (Section 8.2)~~	~~No liquid penetration after 8 min~~	-

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
-	~~Overall function~~	~~ASTM F1154, modified (Section 8.40)~~	~~Complete in ≤ 20 min with garment closure remaining engaged~~	-
-	-	-	~~Test subject has visual acuity of 20/35 or better through visor and facepiece lens~~	-
-	-	-	~~Protective flap remains closed over closure system~~	-
-	-	-	~~Test subject properly identifies 3 out of 4 numbers on NFPA 704 placard at each angle~~	-
-	-	-	~~No liquid penetration following exercises~~	-
~~Garment material~~	~~Biopenetration test one~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Tensile strength~~	~~ASTM D5034 (Section 8.4)~~	~~≥225.5 N (≥50 lbf)~~	-
-	~~Burst strength~~	~~ASTM D3787 (Section 8.5)~~	~~≥178 N (≥40 lbf)~~	-
-	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.6)~~	~~≥25 N (≥5 ½ lbf)~~	-
-	~~Tear strength~~	~~ASTM D5587 (Section 8.7)~~	~~≥36 N (≥8 lbf)~~	-
-	~~Water absorption resistance~~	~~AATCC 42, modified (Section 8.31)~~	~~≤30%~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
-	~~Total heat loss~~	~~ASTM F1868 (Section 8.32)~~	~~≥450 W/m~~ ^{2}	-
-	~~Evaporative resistance~~	~~Section 8.42~~	~~≤30 Pa m~~ ^{2} ~~/W~~	-
~~Garment sock~~	~~Tensile strength~~	~~ASTM D5034 (Section 8.4)~~	~~≥50 N (≥11.2 lbf)~~	-
-	~~Burst strength~~	~~ASTM D3787 (Section 8.5)~~	~~≥66 N (≥14.9 lbf)~~	-
-	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.6)~~	~~≥12 N (≥2.7 lbf)~~	-
-	~~Tear strength~~	~~ASTM D5587 (Section 8.7)~~	~~≥17 N (≥3.8 lbf)~~	-
-	~~Seam breaking strength~~	~~ASTM D1683/D1683M (Section 8.8)~~	~~≥50 N (≥11.2 lbf)~~	-
~~Garment seams~~	~~Biopenetration test one~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Breaking strength~~	~~ASTM D1683/D1683M (Section 8.8)~~	~~≥222.5 N (≥50 lbf)~~	-

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Garment visors~~	~~Visor drop ball impact resistance~~	~~ANSI/ISEA Z87.1, modified (Section 8.41)~~	~~No puncture, cracks, holes, or fractures~~	-
~~Garment labels~~	~~Label durability and legibility~~	~~Section 8.33~~	~~Remain in place and legible~~	-
~~Garment metal parts~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No corrosion~~	-
~~Garment fastener tape~~	~~Breaking strength~~	~~ASTM D5034 (Section 8.39)~~	~~≥ minimum breaking strength in Table 1 of A-A-55126B~~	-
-	~~Shear strength~~	~~ASTM D5169 (Section 8.39)~~	~~≥ minimum shear strength in Table 1 of A-A-55126B~~	-
-	~~Peel strength~~	~~ASTM D5170 (Section 8.39)~~	~~≥ minimum peel strength in Table 1 of A-A-55126B~~	-
~~Garment zippers~~	~~Crosswise breaking strength~~	~~A-A-55634B~~	~~Report~~	-
~~Single-Use Emergency Medical Examination Gloves~~				
~~Gloves~~	~~Liquidtight integrity test two~~	~~ASTM D5151 (Section 8.9)~~	~~AQL ≥ 1.5~~	-
-	~~Biopenetration test two~~	~~ASTM F1671/F1671M (Section 8.10)~~	~~No penetration of the Phi-X174 bacteriophage~~	-
-	~~Dexterity~~	~~Crawford small parts dexterity test, screws technique (Section 8.14)~~	~~≤ 120% of baseline test measurements~~	-
~~Glove materials~~	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.11)~~	~~≥14 MPa (≥2000 psi)~~	-
-	~~Ultimate elongation~~	~~Method A of ASTM D412 (Section 8.12)~~	~~≥500%~~	-
-	~~Puncture resistance test one~~	~~Modified Method A of ASTM F1342/F1342M (Section 8.13)~~	~~≥4.5 N (≥1 lbf)~~	-
-	~~Protein content~~	~~ASTM D5712 (Section 8.15)~~	~~≤50 µg/g (≤50 ppm)~~	-
~~Emergency Medical Cleaning/Utility Gloves~~				
~~Gloves~~	~~Liquidtight integrity test two~~	~~ASTM D5151 (Section 8.9)~~	~~No leakage~~	-
-	~~Biopenetration test two~~	~~ASTM F1671/F1671M (Section 8.10)~~	~~No penetration of the Phi-X174 bacteriophage~~	-
-	~~Dexterity test two~~	~~ASTM F2010/F2010M, Modified (Section 8.26)~~	~~Average % of barehanded control ≤200%~~	-
-	~~Tactility~~	~~Section 8.30~~	~~Permit pick-up of pins having a diameter of ≥ 5.0 mm (0.2 in.)~~	-

~~**Ensemble or Element**~~	~~**Performance Requirement**~~	~~**Test Method**~~	~~**Requirement**~~	~~**Result**~~
~~Glove materials~~	~~Chemical permeation resistance~~	~~ASTM F739, Modified (Section 8.24)~~	~~≤6.0 µg/cm ^{2} (60 mg/m ^{2})~~	~~See separate table~~
-	~~Tensile strength~~	~~Method A of ASTM D412 (Section 8.11)~~	~~≥10.3 MPa (≥1500 psi)~~	-
-	~~Puncture resistance test one~~	~~ASTM F1342/F1342M, Modified Method A (Section 8.13)~~	~~≥9 N (≥2 lbf)~~	-
-	~~Cut resistance~~	~~ASTM F1790 (Section 8.18)~~	~~≥20 mm (≥0.8 in.)~~	-
-	~~Abrasion resistance test two~~	~~ASTM D3884 (Section 8.25)~~	~~No wear-through after 1000 cycles~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
~~***Multiple-Use Emergency Medical Work Gloves***~~				
~~Gloves~~	~~Liquidtight integrity~~	~~Section 8.29~~	~~No water penetration~~	-
-	~~Dexterity test two~~	~~ASTM F2010/F2010M (Section 8.26)~~	~~Average % of barehanded control ≤200%~~	-
-	~~Torque~~	~~ASTM F2961 (Section 8.27)~~	~~Barehanded control ≥65%~~	-
-	~~Tactility~~	~~Section 8.30~~	~~Permit pick-up of pins having a diameter of ≤8.0 mm (0.3 in.)~~	-
~~Glove materials~~	~~Biopenetration~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.13)~~	~~No puncture under an applied force of 9 N (2 lbf)~~	-
-	~~Cut resistance~~	~~ASTM F1790 (Section 8.18)~~	~~≥20 mm (≥0.8 in.)~~	-
-	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.25)~~	~~No wear-through~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
~~Hardware~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No more than light surface-type corrosion or oxidation, ferrous metals show no corrosion of the base metal, and hardware items remain functional~~	-
~~Labels~~	~~Label durability and legibility~~	~~Section 8.33~~	~~Be legible~~	-
~~***Single-Use Emergency Medical Facemask***~~				
~~Facemask~~	~~High barrier performance class~~	~~ASTM F2100~~	~~Meet Level 3 barrier in Table 1 in Section 6 in ASTM F2100~~	-

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
-	~~Liquidtight integrity test three~~	~~ASTM F1862/F1862M (Section 8.17)~~	~~No liquid penetration~~	-
-	-	-	-	-
~~Single-Use Emergency Medical Eye and Face Protection Device~~				
~~Eye and face protection device~~	~~Biopenetration test one~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Liquidtight integrity test three~~	~~ASTM F1862/F1862M (Section 8.17)~~	~~No liquid penetration~~	-
-	~~Visual acuity/fogging resistance~~	~~Section 8.16~~	~~≥ 20/35 visual acuity line~~	-
~~Device material~~	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
~~Multiple-Use Emergency Medical Eye and Face Protection Device~~				
~~Eye and face protection device~~	~~Liquidtight integrity test three~~	~~ASTM F1862/F1862M (Section 8.17)~~	~~No liquid penetration~~	-
-	-	-	-	-
~~Device hardware~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No more than light surface-type corrosion or oxidation, ferrous metals show no corrosion of the base metal, and hardware items remain functional~~	-
~~Single-Use Emergency Medical Footwear Cover~~				
~~Upper materials~~	~~Biopenetration test one~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Tensile strength~~	~~ASTM D5034 (Section 8.4)~~	~~≥50 N (≥11.2 lbf)~~	-
-	~~Burst strength~~	~~ASTM D3787 (Section 8.5)~~	~~≥66 N (≥14.9 lbf)~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
~~Upper material seams~~	~~Biopenetration test one~~	~~ASTM F1671/F1671 (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Breaking strength~~	~~ASTM D1683/D1683M (Section 8.8)~~	~~≥50 N (≥11.2 lbf)~~	-
~~Wear surface materials~~	~~Biopenetration test one~~	~~ASTM F1671/F1671 (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.25)~~	~~No wear-through~~	-
-	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.13)~~	~~Puncture force > 8 N (1.8 lbf)~~	-
-	~~Slip resistance~~	~~ASTM F2913 (Section 8.20)~~	~~Coefficient of friction of ≥ 0.40~~	-
~~Multiple-Use Emergency Medical Footwear~~				

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Footwear~~	~~Liquidtight integrity~~	~~FIA Standard 1209 (Section 8.23)~~	~~No leakage and no separation of outer sole~~	-
~~Upper materials~~	~~Biopenetration~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Cut resistance~~	~~ASTM F1790 (Section 8.18)~~	~~≥20 mm (≥0.8 in.)~~	-
-	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.13)~~	~~No puncture under an applied force of 45 N (10 lbf)~~	-
-	~~Flammability~~	~~ASTM D1230 (Section 8.35)~~	~~Flame spread ≥ 3.5 sec~~	-
~~Upper material seams~~	~~Biopenetration~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
~~Outer sole~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.19)~~	~~Relative volume loss shall ≤ 250~~ $\cancel{mm^3}$ ~~(9.8~~ $\cancel{in.^3}$~~)~~	-
-	~~Slip resistance~~	~~ASTM F2913 (Section 8.20)~~	~~Coefficient of friction of ≥ 0.40~~	-
~~Eyelets and stud hooks~~	~~Eyelet and stud post attachment~~	~~Section 8.21~~	~~Detachment strength ≥ 295 N (66 lbf)~~	-
~~Hardware~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No more than light surface-type corrosion or oxidation, ferrous metals show no corrosion of the base metal, and hardware items remain functional~~	-
~~Labels~~	~~Label durability and legibility~~	~~Section 8.33~~	~~Be legible~~	-
~~Multiple-Use Medical Care Facility Footwear~~				
~~Footwear~~	~~Liquidtight integrity~~	~~FIA Standard 1209 (Section 8.23)~~	~~No leakage and no separation of outer sole~~	-
~~Upper materials~~	~~Biopenetration~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
-	~~Cut resistance~~	~~ASTM F1790(Section 8.18)~~	~~≥20 mm (≥0.8 in.)~~	-
-	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.13)~~	~~No puncture under an applied force of 45 N (10 lbf)~~	-
~~Upper material seams~~	~~Biopenetration~~	~~ASTM F1671/F1671M (Section 8.3)~~	~~No penetration of Phi-X174 bacteriophage~~	-
~~Outer soles~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.19)~~	~~Relative volume loss shall ≤ 250~~ $\cancel{mm^3}$ ~~(9.8~~ $\cancel{in.^3}$~~)~~	-
-	~~Slip resistance~~	~~ASTM F2913 (Section 8.20)~~	~~Coefficient of friction of ≥ 0.40~~	-
~~Eyelets and stud hooks~~	~~Eyelet and stud post attachment~~	~~Section 8.21~~	~~Detachment strength ≥ 295 N (66 lbf)~~	-

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Hardware~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No more than light surface-type corrosion or oxidation, ferrous metals show no corrosion of the base metal, and hardware items remain functional~~	-
~~Labels~~	~~Label durability and legibility~~	~~Section 8.33~~	~~Be legible~~	-
~~Multiple-Use Emergency Medical Helmet~~				
~~Suspension systems~~	~~Suspension system retention~~	~~Section 8.36~~	~~Force required to separate any individual attachment point of the suspension assembly from the helmet shell and each adjusting mechanism of the suspension system assembly ≥22 N (5 lbf). Adjusting mechanism functions properly.~~	-
~~Chin straps~~	~~Retention system~~	~~Section 8.37~~	~~No breakage and stretch or slip ≤38 mm (1½ in.). All mechanisms function properly.~~	-
~~Goggle/headlamp clips~~	~~Goggle and headlamp clip attachment~~	~~Section 8.38~~	~~Not release from the shell. Clips deflect ≤6 mm (¼ in.) from their original position.~~	-
~~Hardware~~	~~Corrosion resistance~~	~~ASTM B117 (Section 8.22)~~	~~No more than light surface-type corrosion or oxidation, ferrous metals show no corrosion of the base metal, and hardware items remain functional~~	-
~~Helmet retroreflective markings~~	~~Retroreflection~~	~~Section 8.37~~	~~Ra ≥ 100 cd/lux/m~~ ^{2} ~~(100 cd/fc/ft~~ ^{2} ~~)~~	-
~~Emergency Medical Powered Air-Purifying Respirator~~				
~~Hood materials~~	~~Performance requirements~~	-	~~Meet requirements in 22.1.1 with exception of 22.1.1.7, or 22.1.2 with exception of 22.1.2.9 (provide test data as indicated for single-use or multiple-use emergency medical garments above)~~	-
~~Single-Use Emergency Medical Protective Ensemble~~				
~~Ensembles~~	~~Liquidtight integrity test one~~	~~ASTM F1359/F1359M (Section 8.2)~~	~~No liquid penetration~~	-
-	~~Overall ensemble function~~	~~ASTM F1154, Modified (Section 8.40)~~	~~Complete tasks in ≤ 20 min with garment closure remaining engaged~~	-
-	-	-	~~Test subject properly identifies 3 out of 4 numbers on NFPA 704 placard at each angle~~	-
-	-	-	~~Visual acuity ≥ 20/35~~	-
-	-	-	~~Protective flap remains closed over closure system~~	-
-	-	-	~~No liquid penetration following exercises~~	-

~~Ensemble or Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Garments~~	~~Performance requirements~~	-	~~Meets requirements in 22.1.1 (provide test data as indicated for single-use emergency medical garments above)~~	-
~~Examination gloves~~	~~Performance requirements~~	-	~~Meets requirements in 22.2.1 (provide test data as indicated for single-use emergency medical examination gloves above)~~	-
~~Footwear~~	~~Performance requirements~~	-	~~Meets requirements in 22.4 for respective footwear (provide test as indicated for respective footwear above)~~	-
~~Multiple-Use Emergency Medical Protective Ensemble~~				
~~Ensembles~~	~~Liquidtight integrity test one~~	~~ASTM F1359/F1359M (Section 8.2)~~	~~No liquid penetration~~	-
-	~~Overall ensemble function and integrity~~	~~ASTM F1164 (Section 8.40)~~	~~Complete tasks in ≤ 20 min with garment closure remaining engaged~~	-
-	-	-	~~Test subject properly identifies 3 out of 4 numbers on NFPA 704 placard at each angle~~	-
-	-	-	~~Visual acuity ≥ 20/35~~	-
-	-	-	~~Protective flap remains closed over closure system~~	-
-	-	-	~~No liquid penetration following exercises~~	-

~~Table 10.3.1.1(b) Format for Reporting NFPA 1999–Compliant Certification Permeation Test Data in Technical Data Package~~

~~Chemical~~	~~Cleaning Utility Glove Material~~	~~Result~~
~~Glutaraldehyde, 40% w/w~~	~~≤6.0~~	-
~~Isopropanol, 70% w/w~~	~~≤6.0~~	-
~~Sodium hypochlorite, 5%~~	~~≤6.0~~	-
~~Peracetic acid, ≤30%~~	~~≤6.0~~	-

~~A.10.3.1.1~~

~~Purchasers should request that all documentation and performance data be provided in a format that allows easy comparison of products to aid selection. A standard format for reporting certification data allows end user organizations to readily compare products based on required certification data. Certification organizations reviewing compliance of manufacturer technical data packages to the requirements in 10.3.1.1 can allow modifications to the tables to address single-use or multiple-use protective ensembles and ensemble elements with multiple options, such as different external fittings.~~

~~10.3.2~~

~~In the technical data package, the manufacturer shall describe the single-use or multiple-use protective ensemble and ensemble elements in terms of manufacturer trade name and model number, manufacturer replaceable components, available options, accessories, testing devices, and sizes.~~

~~10.3.3~~

~~In the technical data package, the manufacturer shall describe the available sizes of the single-use or multiple-use protective ensemble and ensemble elements.~~

Submitter Information Verification

Committee: FAE-EMS

Submittal Date: Mon Nov 09 11:15:31 EST 2020

Committee Statement

Committee Statement: The NFPA Standards Council approved the technical committee's request to remove NFPA 1999 from the consolidated NFPA 1990 document. This section is being removed as it pertains specifically to NFPA 1999.

Response Message: SR-98-NFPA 1990-2020

Public Comment No. 11-NFPA 1990-2020 [Chapter 10]

Public Comment No. 246-NFPA 1990-2020 [Sections A.10.2.2, A.10.2.2(3), A.10.2.2(4), A.10.2.3, A.10...]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters
6 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Area, James B.

Billings, Lincoln

Bogucki, Sandy

Davis, James E.

Davis, Todd P.

Patrick, Richard W.

Affirmative All

Fithian, William A.

Freeman, Patricia A.

Hickerson, Barry L.

Horowitz, Jason

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Newsom, Amanda H.

Sadtler, Jeff

Stull, Jeffrey O.

Second Revision No. 99-NFPA 1990-2020 [Chapter 11]

11-deleted ~~Design Requirements (NFPA 1999)-DELETED~~

~~**11.1** Emergency Medical Protective Garment Design Requirements.~~

~~**11.1.1** Single-Use Emergency Medical Garment Design Requirements.~~

~~**11.1.1.1**~~

~~Garments shall be designed to cover any part of the upper and lower torso, excluding hands, face, and feet.~~

~~**11.1.1.2***~~

~~Garments shall be permitted to be configured as full body clothing such as jackets and pants or coveralls, and non-full body clothing such as aprons, sleeve protectors, sleeved aprons or smocks, and hoods.~~

~~**A.11.1.1.2**~~

~~In specifying full body emergency medical protective garments, garments should include the combination of both jacket or coat and pants in order to provide protection to the whole body. Exclusion of the protective pants permits exposure of individuals to hazards associated with emergency medical operations.~~

~~**11.1.1.2.1**~~

~~Where garments are configured as aprons, garments shall be designed to protect the front torso of the wearer from the neck to below the knees.~~

~~**11.1.1.2.2**~~

~~Where garments are configured as sleeve protectors, garments shall be designed to protect the arm of the wearer from the wrist crease to a distance of no less than 405 mm (16 in.) from the wrist crease.~~

~~**11.1.1.2.3**~~

~~Where garments are configured as sleeved aprons, garments shall be designed to protect the front torso of the wearer from the neck to below the knees and the arm of the wearer to the wrist crease.~~

~~**11.1.1.2.4**~~

~~Where garments are configured as separate hoods, garments shall be designed to protect the wearer at the top, side, and back of the wearer's head and the wearer's neck.~~

~~**11.1.1.3**~~

~~Garments shall be permitted to include integrated socks to protect the wearer's feet in conjunction with outer footwear.~~

~~**11.1.1.3.1**~~

~~Where garments incorporate socks, the socks shall be designed as an extension of the garment leg and shall cover the entire foot and ankle.~~

~~**11.1.1.4**~~

~~Garments shall be permitted to include integrated hoods to protect portions of the wearer's head and face in conjunction with eye and face protection devices and appropriate respirators.~~

~~11.1.1.4.1~~

~~Where garments incorporate hoods, the hood shall cover at least the top, back, and sides of the head.~~

~~11.1.1.4.2~~

~~Where garments are configured as separate hoods, the hood shall cover at least the top, back, and sides of the head.~~

~~11.1.1.4.3~~

~~Where garments incorporate hoods or are provided as separate hoods, the hood shall be permitted to have a face opening that accommodates the wearing of specific eye and face protection devices or respirators.~~

~~11.1.1.4.4~~

~~Where garments incorporate hoods or are provided as separate hoods, the hood shall be permitted to include a clear visor that covers the wearer's eyes and face.~~

~~11.1.1.5*~~

~~All portions of the body covered by the garment item shall be provided with barrier protection.~~

~~A.11.1.1.5~~

~~The requirement in 11.1.1.5 is to ensure that an entire garment will provide biopenetration protection for the wearer. In the past, certain parts of a garment, such as the front or the sleeves from wrist to elbows but not above the elbow, were permitted to provide the biopenetration protection, but the purchaser/wearer might not have been aware that the biopenetration protection was only partial.~~

~~11.1.1.6*~~

~~The barrier layer used in the construction of the garment shall be a single, nonseparable layer.~~

~~A.11.1.1.6~~

~~The requirement in 11.1.1.6 is not intended to preclude the garment designer/manufacturer from attaching the barrier layer to other garment materials via hemming and binding means in an emergency medical garment.~~

~~It is intended that the barrier layer be composed of a single, nonseparable laminate or coated material. It is intended not to allow more than one garment material layer to be designated as and tested as the barrier layer.~~

~~The requirement in 11.1.1.6 is also intended to permit evaluation of the barrier layer's biopenetration resistance.~~

~~11.1.1.7*~~

~~All external fittings including, but not limited to, zippers, snaps, or other fasteners of specimen garments shall be examined and shall be free of rough spots, burrs, or sharp edges that could tear the garment or glove materials.~~

~~A.11.1.1.7~~

~~The design requirement prevents fittings being used in the construction of garments that could potentially snag or tear protective materials.~~

~~**11.1.2** Multiple-Use Emergency Medical Garment Design Requirements.~~

~~**11.1.2.1**~~

~~Garments shall be designed to cover any part of the upper and lower torso, excluding hands, face, and feet.~~

~~**11.1.2.2**~~

~~Garments shall be permitted to be configured as full body clothing such as jackets and pants or coveralls, and non-full body clothing such as aprons, sleeve protectors, sleeved aprons or smocks, and hoods. *(See A.11.1.1.2 .)*~~

~~**11.1.2.2.1**~~

~~Where garments are configured as aprons, garments shall be designed to protect the front torso of the wearer from the neck to below the knees.~~

~~**11.1.2.2.2**~~

~~Where garments are configured as sleeve protectors, garments shall be designed to protect the arm of the wearer from the wrist crease to a distance of no less than 405 mm (16 in.) from the wrist crease.~~

~~**11.1.2.2.3**~~

~~Where garments are configured as sleeved aprons, garments shall be designed to protect the front torso of the wearer from the neck to below the knees and the arms of the wearer to the wrist crease.~~

~~**11.1.2.2.4**~~

~~Where garments are configured as separate hoods, garments shall be designed to protect the wearer at the top, side, and back of the wearer's head and the wearer's neck.~~

~~**11.1.2.3**~~

~~Garments shall be permitted to include integrated socks to protect the wearer's feet in conjunction with outer footwear.~~

~~**11.1.2.3.1**~~

~~Where garments incorporate socks, the socks shall be designed as an extension of the garment leg and shall cover the entire foot and ankle.~~

~~**11.1.2.4**~~

~~Garments shall be permitted to include integrated hoods to protect portions of the wearer's head and face in conjunction with eye and face protection devices and appropriate respirators.~~

~~**11.1.2.4.1**~~

~~Where garments incorporate hoods, the hood shall cover at least the top, back, and sides of the head.~~

~~**11.1.2.4.2**~~

~~Where garments are configured as separate hoods, the hood shall cover at least the top, back, and sides of the head.~~

~~**11.1.2.4.3**~~

~~Where garments incorporate hoods or are provided as separate hoods, the hood shall be permitted to have a face opening that accommodates the wearing of specific eye and face protection devices.~~

~~**11.1.2.4.4**~~

~~Where garments incorporate hoods or are provided as separate hoods, the hood shall be permitted to include a clear visor that covers the wearer's eyes and face.~~

~~**11.1.2.5**~~

~~All portions of the body covered by the garment item shall be provided with barrier protection. *(See A.11.1.1.5 .)*~~

~~**11.1.2.6**~~

~~The barrier layer used in the construction of the garment shall be a single, nonseparable layer. *(See A.11.1.1.6 .)*~~

~~**11.1.2.7**~~

~~All external fittings including, but not limited to, zippers, snaps, or other fasteners of specimen garments shall be examined and shall be free of rough spots, burrs, or sharp edges that could tear the garment or glove materials.~~

~~**11.1.2.8***~~

~~Where visibility materials are used on garments and the garments are intended to be used as high-visibility safety apparel, garments shall meet the respective requirements for Type P Performance Class 2 or Class 3 in accordance with ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* .~~

~~**A.11.1.2.8**~~

~~The authority having jurisdiction should conduct a risk assessment and determine the level of visibility required in an ensemble or protective clothing for emergency medical incidents operations, based upon the anticipated use of such garments.~~

~~The Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)* requires workers on the right-of-way of all roadways to wear high-visibility apparel that is compliant to ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories* , Performance Class 2 or Class 3. It is possible to be compliant with the MUTCD either by incorporating ANSI-compliant high-visibility fluorescent and retroflective materials into NFPA 1999 –compliant apparel such as a jacket, parka, shirt, and so on, or using a supplemental high-visibility garment. High-visibility component materials incorporated into primary apparel should comply with the requirements of prevailing standards applying to the chosen ensemble, such as NFPA 1999 or ANSI/ISEA 107. The MUTCD also allows for the use of garments specified in ANSI/ISEA 207, *American National Standard for High-Visibility Public Safety Vests* , as supplemental garments for public safety workers.~~

~~In 2015, the International Safety Equipment Association (ISEA) updated ANSI/ISEA 107 combining both the 2010 edition of ANSI/ISEA 107 and the 2011 edition of ANSI/ISEA 207 into a single standard, where the former ANSI/ISEA 107 Class 1 performance requirements are considered Type O for off-road and non-roadway use, former ANSI/ISEA 107 Class 2 and Class 3 performance requirements are now Type R for roadway and temporary traffic control zones, and Type P reflects two classes — Performance Class 2 and Performance Class 3 — for emergency and incident responders and law enforcement personnel. The Type P performance classes in terms of the amount of fluorescent (background) and retroreflective materials are considered the most appropriate for combination with emergency medical protective clothing.~~

~~Users of protective garments should be aware that visibility markings have varying durability under field use conditions. The visibility materials can be damaged but still appear to be in good condition or can become soiled and lose retroreflective or fluorescent qualities. Such visibility markings can also lose retroreflective qualities in rain.~~

~~**11.2** Emergency Medical Glove Design Requirements.~~

~~**11.2.1** Single-Use Emergency Medical Examination Glove Design Requirements.~~

~~**11.2.1.1***~~

~~Examination gloves shall be designed and designated to meet only the single-use requirements of this standard.~~

~~**A.11.2.1.1**~~

~~NFPA 1581 requires single-use emergency medical examination gloves for emergency medical operations.~~

~~**11.2.1.2**~~

~~In order to label or otherwise represent examination gloves as compliant, the manufacturer shall provide gloves in not less than four sizes.~~

~~**11.2.1.3**~~

~~Examination gloves shall be permitted to be provided in ambidextrous sizing.~~

~~**11.2.1.4**~~

~~Examination glove sizing shall be consistent with EN 455-2, *Medical gloves for single use — Part 2: Requirements and testing for physical properties* .~~

~~**11.2.2** Single-Use Emergency Medical Cleaning/Utility Glove Design Requirements.~~

~~**11.2.2.1**~~

~~In order to label or otherwise represent cleaning/utility gloves as compliant, the manufacturer shall provide gloves in not less than four sizes.~~

~~**11.2.2.2**~~

~~Cleaning/utility glove hand circumference sizing shall be in accordance with Clause 51 of EN 420, *Protective Gloves — General requirements and test methods* . Requirements for glove length shall be disregarded.~~

~~**11.2.2.3**~~

~~Gloves shall have a length of at least 278 mm (11 in.).~~

~~**11.2.2.4**~~

~~Cleaning/utility gloves and related hardware shall be examined and shall be free of rough spots, burrs, or sharp edges that could tear garment or glove material.~~

~~**11.2.3** Multiple-Use Emergency Medical Work Glove Design Requirements.~~

~~**11.2.3.1**~~

~~Emergency medical work gloves shall be designed and designated to meet only the multiple-use requirements of this standard.~~

~~**11.2.3.2**~~

~~Emergency medical work gloves shall be designed and configured to provide physical and barrier protection to the wearer's hand from the fingertips to at least the wrist crease.~~

~~**11.2.3.2.1**~~

~~In order to label gloves as compliant, the manufacturer shall provide gloves in not fewer than the following sizes: XS, S, M, L, and XL.~~

~~**11.2.3.2.2**~~

~~Emergency medical work gloves shall be permitted to include a separable liner or inner glove for the purpose of achieving the barrier protection function.~~

~~**11.2.3.2.3**~~

~~Emergency medical work gloves shall be permitted to use either a single-use emergency medical examination glove or a single-use emergency medical cleaning/utility glove as the inner glove when designed to be part of a single use or multiple use emergency medical protective ensemble.~~

~~**11.2.3.3**~~

~~The glove shall consist of a glove body.~~

~~11.2.3.3.1~~

~~The glove shall extend circumferentially from the tip of the fingers to the at least wrist crease.~~

~~11.2.3.3.2~~

~~The portion of the glove that extends from the tip of the fingers to the wrist crease shall be considered to be the glove body and shall meet the glove body requirements in 12.2.3 .~~

~~11.2.3.3.3~~

~~The optional portion of the glove that extends from the wrist crease up to the end of the entire glove shall be considered to be the glove interface component and shall meet the glove interface component requirements in 12.2.3 . If it is not attached to a garment sleeve or if it is part of an ensemble that includes an interface between the glove and garment sleeve, the glove interface component shall create a close fit at the opening to restrict the entry of foreign particles and shall allow the glove to fit closely around the wearer's wrist.~~

~~11.2.3.3.4~~

~~The glove shall be designed to fit closely around the wearer's wrist or shall be adjustable such that a close fit around the wearer's wrist can be achieved to restrict the entry of foreign particles.~~

~~11.2.3.3.5~~

~~The location of the wrist crease shall be determined by placing the glove palm down on a measurement board and securing (locking) the fingertips down onto the board.~~

~~11.2.3.3.6~~

~~A 1 lb weight shall be attached to the end of the glove body or glove interface component. The weight shall not be attached to a knitted wristlet and shall be applied evenly across the glove.~~

~~11.2.3.3.7*~~

~~Two points shall be marked on the back side of the glove. The location of the points shall be determined by measuring down the following distances according to glove size, from the finger crotch of digit two and from the finger crotch of digit three:~~

~~XS: 9.46 cm (3.72 in.)~~

~~S: 10.04 cm (3.95 in.)~~

~~M: 10.68 cm (4.20 in.)~~

~~L: 11.21 cm (4.42 in.)~~

~~XL: 11.73 cm (4.62 in.)~~

~~A.11.2.3.3.7~~

~~The measurements given in 21.2.3.3.7(1) through 21.2.3.3.7(5) are palm lengths and are calculated by subtracting the median length of digit 3 from the median hand length found for each glove size.~~

~~11.2.3.3.8~~

~~A straight line shall be drawn on the back side of the glove using the two points. This line shall be drawn around the side edges of the glove.~~

~~11.2.3.3.9~~

~~The glove shall be removed from the measurement board. A line shall be drawn on the palm side of the glove by connecting the lines from the side edges of the glove.~~

~~**11.2.3.3.10**~~

~~The resulting straight line around the circumference of the glove shall be the location of the wrist crease.~~

~~**11.2.3.4**~~

~~Hand dimensions for the selection of the proper emergency medical work glove size shall consist of measuring the hand circumference and hand length dimensions as shown in Figure 11.2.3.4 .~~

~~**Figure 11.2.3.4 Method of Measuring Hand Dimensions for Selection of Proper Glove Size.**~~

~~**11.2.3.4.1**~~

~~Hand circumference shall be measured by placing a measuring tape on a table or other flat surface with the numerals facing downward. The subject shall place the right hand, palm down and fingers together, in the middle of the tape so that the tape can pass straight across the metacarpal knuckles. The circumference shall be measured to the nearest 3 mm ($^1/_8$ in.) as shown in Figure 11.2.3.4 .~~

~~**11.2.3.4.2**~~

~~Finger circumference shall be measured at the proximal interphalangeal joint, the first knuckle. Finger length shall be measured from the tip of the finger to the base of the finger crease on the palm side.~~

~~**11.2.3.4.3**~~

~~Hand length shall be measured by placing the subject's hand, palm down, on a piece of paper with the fingers together and the hand and arm in a straight line. The thumb shall be fully abducted, extended away from the palm as far as possible. The paper shall be marked at the tip of the third, or middle, finger. A pencil mark shall be placed in the notch at the base of the thumb where the thumb joins the wrist. The straight line distance between the two points shall be measured to the nearest 3 mm ($^1/_8$ in.) as shown in Figure 11.2.3.4 .~~

~~**11.2.3.4.4**~~

~~The glove size indicated on the label shall be determined by the hand length and hand circumference ranges provided in Table 11.2.3.4.4 .~~

~~Table 11.2.3.4.4 Hand Length and Circumference Ranges~~

~~**Glove Size**~~	~~**Range for Hand Length**~~		~~**Range for Hand Circumference**~~	
	~~**cm**~~	~~**in.**~~	~~**cm**~~	~~**in.**~~
~~Extra small (XS)~~	~~16.25–17.25~~	~~6.40–6.79~~	~~16.25–20.25~~	~~6.40–7.97~~
~~Small (S)~~	~~17.25–18.25~~	~~6.79–7.19~~	~~17.25–21.25~~	~~6.79–8.37~~
~~Medium (M)~~	~~18.25–19.25~~	~~7.19–7.58~~	~~18.25–22.25~~	~~7.19–8.76~~
~~Large (L)~~	~~19.25–20.25~~	~~7.58–7.97~~	~~19.25–23.25~~	~~7.58–9.15~~
~~Extra large (XL)~~	~~20.25–21.25~~	~~7.97–8.37~~	~~20.25–24.25~~	~~7.97–9.55~~

~~**11.2.3.5**~~

~~Any permanent attachment provided by the manufacturer to a work glove shall not interfere with the function of that work glove or with the function of any of the work glove component parts.~~

~~**11.2.3.6**~~

~~Where work gloves are provided by the manufacturer with permanent attachments, the work gloves shall meet all of the design and performance requirements of this standard with permanent attachments installed. In all cases, such permanent attachments shall not degrade the performance of the work gloves.~~

~~**11.3*** Emergency Medical Eye and Face Protection Device Design Requirements.~~

~~A.11.3~~

~~A variety of different eye and face protection devices exist for first responders and first receivers engaged in emergency medical operations. These devices provide a range of different design characteristics and protective performance. NFPA 1999 addresses three different types of eye and face protection devices. The labeling, design, and performance criteria provided in the standard are intended to provide emergency medical first responders and first receivers with eye and face protective devices that limit the degree to which they can be exposed to liquid-borne pathogens and might or might not protect against airborne pathogens. The following descriptions are provided for each type of eye protection face device covered by NFPA 1999 .~~

~~Single-use facemasks are surgical or masks that are typically used in general healthcare. These facemasks are intended to provide limited protection to the face and nose of the wearer and can include an attached plastic faceshield for additional limited protection to the eyes. The materials used in the construction of these facemasks resist the penetration of blood and other body fluids; however, these facemask materials are not viral penetration resistant as compared to other clothing elements addressed in NFPA 1999 . This is partly because the materials used for these facemasks have to have a degree of air permeability that permits airflow to enter and leave the facemask during wearer breathing. Specific design criteria have been provided in NFPA 1999 to ensure that the facemasks provide adequate coverage of the individual's face and provide for the ease of donning and doffing by specifying ear loops versus ties. If plastic shields are attached to the facemask, areas of face coverage for these items are specified. It is important to note that facemask with plastic shields partially covering eyes are not primary eye protection and might not prevent liquids from splashing onto the eyes or onto the wearer's face that then drips down into the eyes. The performance requirements for single-use facemasks require that these products meet the highest level of protection established in ASTM F2100,~~ ~~*Standard Specification for Performance of Materials Used in Medical Face Masks*~~ ~~. The criteria provided in the ASTM F2100 standard primarily applies to the ability of the material to hold out splashes of synthetic blood and filter both bacteria and small particles. There is also a requirement for the allowable pressure drop across the material as evidence of breathing resistance. A supplemental visual acuity test is provided in NFPA 1999 for these products to ensure clarity of vision.~~

~~Single-use eye and face protection devices are faceshields that cover the eyes of the wearer that are disposable after a single use. These devices generally do not meet the criteria specified in ANSI/ISEA Z87.1,~~ ~~*American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*~~ ~~. Design criteria for these devices primarily dictates the areas of coverage provided by the device over the wearer's face and eyes using a headform. Performance criteria include viral penetration resistance testing to be applied to any device materials that are not plastic or continuous films. A liquid integrity test is also applied to the entire device to assess areas of protection from exposure to liquid splashes. The visual acuity through the device is further assessed and all textile layers are assessed for flammability.~~

~~Multiple-use eye and face protection devices can be safety glasses, goggles, and faceshields that are of a durable construction. NFPA 1999 specifies that these devices comply with the relevant requirements of ANSI/ISEA Z87.1,~~ ~~*American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*~~ ~~, that includes a D3 splash rating. ANSI/ISEA Z87.1 provides extensive criteria on the ocular and physical protective performance of these devices. Additional criteria are provided for liquid integrity testing of devices that could involve junctures or interfaces between different items that are not continuous in their design such as when a set of goggles might be integrated into a faceshield.~~

~~Eye and face protection can be achieved by other types of devices and clothing. NFPA 1999 permits the certification of hoods that can include a visor, faceshield, or respirator. These clothing items must meet selected design and performance criteria as specified for either single-use or multiple-use garments. There also criteria for the use of loose-fitting powered air-purifying respirators (PAPR). These devices provide full coverage of the wearer's head. Other types of respirators such as full face air-purifying respirators will cover the wearer's face. Surgical N95 filtering facepieces cover the nose and mouth of the wearer.~~

~~The selection of appropriate eye and face protection should account for the expected circumstances of exposure and is determined by hazard and risk assessment. In those emergency medical operations where first responders or first receivers could encounter large volumes of blood or body fluid that could splash onto the face, consideration should be given to the choice of eye and face protection devices that completely cover the wearer's face and head and that provide protection against the penetration of liquids.~~

~~**11.3.1** Single-Use Emergency Medical Facemask Design Requirements.~~

~~**11.3.1.1**~~

~~Facemasks shall incorporate a wire or other device that allows the portion of the facemask that covers the top of the nose to be shaped over the wearer's nose.~~

~~**11.3.1.2**~~

~~Facemasks shall include a means for securing the facemask to the wearer's head that does not require tying.~~

~~**11.3.1.3**~~

~~Where facemasks include plastic shields, the plastic shield shall overlap the top of the face mask by at least 19 mm (¾ in.) over the entire top between points of attachment for the plastic shield.~~

~~**11.3.1.4**~~

~~Where facemasks include plastic shields, the plastic shield shall have a height of at least 50 mm (2 in.) above the top of the facemask.~~

~~**11.3.1.5**~~

~~Where facemasks include plastic shields, the sides of the plastic shield shall extend at least 19 mm (¾ in.) beyond the points of attachment for the plastic shield.~~

~~**11.3.2** Single-Use Emergency Medical Eye and Face Protection Device Design Requirements.~~

~~**11.3.2.1**~~

~~Eye and face protection devices shall be designed to cover part or all of the face, including the eyes.~~

~~**11.3.2.2**~~

~~Where the eye and face protection device is configured as a faceshield, the faceshield shall provide at least the following field of vision:~~

~~Dihedral angle of at least 85 degrees~~

~~Upper dihedral angle of at least 10 degrees~~

~~Lower dihedral angle of at least 40 degrees~~

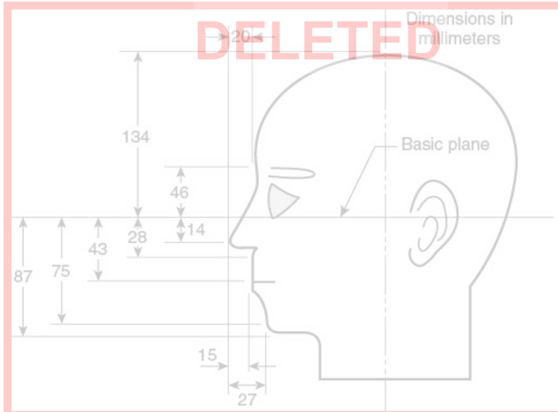
~~**11.3.2.3**~~

~~The field of vision shall be measured from the center of the surface of the eye.~~

~~**11.3.2.4**~~

~~The faceshield shall be positioned on an Alderson 50th percentile male headform specified in Figure 11.3.2.4 .~~

~~**Figure 11.3.2.4 Alderson Headform.**~~



~~**11.3.2.5**~~

~~Face protection devices and related hardware shall be examined for, and shall be free of, rough spots, burrs, or sharp edges that could tear garment or glove materials.~~

~~**11.3.3** Multiple-Use Emergency Medical Eye and Face Protection Device Design Requirements.~~

~~**11.3.3.1**~~

~~Eye and face protection devices shall be designed to cover part or all of the face or head. Face protection devices shall be permitted to be configured as, but are not limited to, splash-resistant eyewear, goggles, faceshields, hooded visors, and combinations of these items.~~

~~**11.3.3.2**~~

~~Eye and face protection devices to be certified as compliant with this standard shall need not be primary eye protection but shall be permitted to be primary eye protection.~~

~~**11.3.3.3**~~

~~Where the eye and face protection device is configured as safety glasses, the safety glasses shall meet the respective requirements for spectacles and be marked at least "Z87 D3" in accordance with, ANSI/ISEA Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices* .~~

~~**11.3.3.4**~~

~~Where the eye and face protection device is configured as goggles, the goggles shall meet the respective requirements for goggles and be marked at least "Z87 D3" in accordance with, ANSI/ISEA Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices* .~~

~~**11.3.3.5**~~

~~Where the eye and face protection device is configured as a faceshield, the faceshield shall meet the respective requirements for faceshields and be marked at least "Z87 D3" in accordance with, ANSI/ISEA Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices* .~~

~~**11.3.3.6***~~

~~Face protection devices and related hardware shall be examined for, and shall be free of, rough spots, burrs, or sharp edges that could tear garment or glove materials.~~

~~**A.11.3.3.6**~~

~~The design requirement prevents hardware that could potentially snag or tear protective materials from being used on face protection devices.~~

~~**11.4** Emergency Medical Footwear Design Requirements.~~

~~**11.4.1** Single-Use Emergency Medical Footwear Cover Design Requirements.~~

~~**11.4.1.1**~~

~~Footwear covers shall be permitted to be offered in only one size.~~

~~**11.4.1.2**~~

~~The footwear cover height shall be a minimum of 150 mm (6 in.).~~

~~**11.4.1.2.1**~~

~~An NFPA 1999 -compliant footwear item in size 9, D width shall be used to determine the height of the footwear cover when placed over the footwear.~~

~~**11.4.1.2.2**~~

~~The footwear cover height shall be determined by measuring lowest point of the footwear cover that extends up over the ankle area of the NFPA 1999 –compliant footwear.~~

~~**11.4.1.3**~~

~~The wear surface of the footwear cover shall extend 25 mm (1 in.) laterally in all directions from the wear surface of standard footwear when measured as specified in 11.5.3.1 .~~

~~**11.4.1.3.1**~~

~~An NFPA 1999 –compliant footwear item in size 9, D width shall be used to determine the lateral extension of the footwear cover wear surface.~~

~~**11.4.1.3.2**~~

~~The NFPA 1999 –compliant footwear item shall be centered inside the footwear cover for determining lateral extension of the footwear cover wear surface.~~

~~**11.4.1.4**~~

~~The footwear cover shall have some means to allow the top of the footwear cover to fit snugly around the wearer's bottom leg.~~

~~**11.4.2** Multiple-Use Emergency Medical Footwear Design Requirements.~~

~~**11.4.2.1**~~

~~Footwear shall be designed and designated to meet only the multiple-use requirements of this standard.~~

~~**11.4.2.2**~~

~~Footwear shall consist of an upper with sole and heel.~~

~~**11.4.2.3**~~

~~Footwear height shall be a minimum of 100 mm (4 in.) when measured according to 11.4.2.3.1 through 11.4.2.3.4 .~~

~~**11.4.2.3.1**~~

~~The footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the footwear, at the lowest point of the topline, excluding the tongue and gusset.~~

~~**11.4.2.3.2**~~

~~Removable insole inserts shall not be removed prior to measurement.~~

~~**11.4.2.3.3**~~

~~Moisture protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline at all locations, with the exception of the area inside of and within 13 mm (0.5 in.) around pull-up holes that fully penetrate the footwear from outside to inside. The height of physical and moisture protection at all locations of the boot shall be no less than 100 mm (4 in.) when measured as described in 11.4.2.3.1 .~~

~~**11.4.2.3.4**~~

~~Physical protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline at all locations, with the exception of the tongue, gusset, and the area inside of and within 13 mm (0.5 in.) around pull-up holes that fully penetrate the footwear from outside to inside. The height of physical protection at all locations of the boot, with the exception of the tongue and gusset, shall be no less than 100 mm (4 in.) when measured as described in 11.4.2.3.1 .~~

~~**11.4.2.4**~~

~~Footwear shall be available in all of the following sizes:~~

~~Men's 5–13, including half sizes, and a minimum of three widths~~

~~Women's 5–10, including half sizes, and a minimum of three widths~~

~~**11.4.2.4.1**~~

~~Manufacturers shall be required to establish and provide, upon request, a size conversion chart for each model or style of protective footwear based on toe length, arch length, and foot width as measured on the Bannock Scientific Foot Measuring Device.~~

~~**11.4.2.4.2**~~

~~Full and half sizes, in each of the three required widths, shall be accomplished by individual and unique lasts to provide proper fit.~~

~~**11.4.2.5**~~

~~Any permanent attachment provided by the manufacturer to footwear shall not interfere with the function of that footwear or with the function of any of the footwear component parts.~~

~~**11.4.2.6**~~

~~Where footwear is provided by the manufacturer with permanent attachments, the footwear shall meet all of the design and performance requirements of this standard with permanent attachments installed. In all cases, such permanent attachments shall not degrade the performance of the footwear.~~

~~**11.4.3** Multiple-Use Medical Care Facility Footwear Design Requirements.~~

~~**11.4.3.1**~~

~~Footwear shall consist of an upper with sole and heel.~~

~~**11.4.3.2**~~

~~Footwear height shall be a minimum of 75 mm (3 in.) when measured according to 11.4.3.2.1 through 11.4.3.2.4 .~~

~~**11.4.3.2.1**~~

~~The footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the footwear, at the lowest point of the topline, excluding the tongue and gusset.~~

~~**11.4.3.2.2**~~

~~Removable insole inserts shall not be removed prior to measurement.~~

~~11.4.3.2.3~~

~~Moisture protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline at all locations, with the exception of the area inside of and within 13 mm (0.5 in.) around pull-up holes that fully penetrate the footwear from outside to inside. The height of physical and moisture protection at all locations of the boot shall be no less than 75 mm (3 in.) when measured as described in 11.4.2.3.1 .~~

~~11.4.3.2.4~~

~~Physical protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline at all locations, with the exception of the tongue, gusset, and the area inside of and within 13 mm (0.5 in.) around pull-up holes that fully penetrate the footwear from outside to inside. The height of physical protection at all locations of the boot, with the exception of the tongue and gusset, shall be no less than 75 mm (3 in.) when measured as described in 11.4.2.3.1 .~~

~~11.4.3.3~~

~~Footwear shall be available in all of the following sizes:~~

~~Men's 5–13, including half sizes, and a minimum of three widths~~

~~Women's 5–10, including half sizes, and a minimum of three widths~~

~~11.4.3.3.1~~

~~Manufacturers shall be required to establish and provide, upon request, a size conversion chart for each model or style of protective footwear based on the toe length, arch length, and foot width as measured on the Bannock Scientific Foot Measuring Device.~~

~~11.4.3.3.2~~

~~Full and half sizes, in each of the three required widths, shall be accomplished by individual and unique lasts to provide proper fit.~~

~~11.5* Multiple-Use Emergency Medical Helmet Design Requirements.~~

~~A.11.5~~

~~Helmet design and performance criteria are provided for emergency medical helmets for use in environments where impact hazards might the present. No specific criteria have been developed to address helmets used inside emergency vehicles to help prevent injuries to emergency medical responders in the event of a vehicle crash. Alternative types of helmets might provide protection for side and top impact for use in emergency vehicles but are not addressed by this standard.~~

~~11.5.1~~

~~Medical helmets shall be designed and designated to meet only the multiple-use requirements of this standard.~~

~~11.5.2~~

~~Helmets shall meet the requirements for Type 1, Class G helmets of ANSI/ISEA Z89.1, *American National Standard for Industrial Head Protection* .~~

~~11.5.3~~

~~Helmets shall be designed to consist of at least a shell with a brim or peak; a means of absorbing energy; a suspension system with a sweatband, chin strap, and nape device; and retroreflective markings.~~

~~11.5.3.1~~

~~The brim shall be an integral part of the helmet shell that extends outward around the entire circumference of the shell.~~

~~**11.5.3.2**~~

~~The peak shall be the part of the helmet shell and shall extend forward over the forehead.~~

~~**11.5.3.3**~~

~~Helmets shall be permitted to have goggle or headlamp clips.~~

~~**11.5.4**~~

~~All materials used in the helmet construction that are designed to come in contact with the wearer's head or skin shall be known to be nonirritating to normal skin.~~

~~**11.5.5**~~

~~The helmet complete with an energy-absorbing system; a suspension system with sweatband, chin strap, nape device, and goggle clips; and retroreflective markings shall not weigh more than 570 g (20 oz).~~

~~**11.5.6**~~

~~Where present, clips for headlamps or goggles shall be permanently attached with at least one clip at the rear of the helmet, and one clip on each side of the helmet. Clips shall be suitably located to retain straps and shall not be attached more than 55 mm (2 $^{3}/_{16}$ in.) above the lower edge of the helmet.~~

~~**11.5.7**~~

~~The suspension shall contain a nape device that shall be removable and replaceable.~~

~~**11.5.7.1**~~

~~The suspension shall be adjustable in $^{1}/_{8}$ hat size or smaller increments.~~

~~**11.5.8**~~

~~A sweatband shall be provided that shall cover at least the forehead portion of the suspension system. Sweatbands shall be either removable and replaceable, or shall be integral with the suspension.~~

~~**11.5.9**~~

~~The helmet shall be designed so that the distance between the top of the head and the underside of the shell cannot be adjusted to less clearance than the manufacturer's requirements for that specific helmet.~~

~~**11.5.10**~~

~~Chin straps shall be provided that attach to the helmet. Both chin and nape straps shall not be less than 13 mm ($^{1}/_{2}$ in.) in width.~~

~~**11.5.11**~~

~~A minimum of 2580 mm ^{2} (4 in. ^{2}) of retroreflective markings shall be visible when the helmet is viewed from the sides, front, and rear.~~

~~**11.5.11.1**~~

~~The retroreflective markings shall be placed above the goggle or headlamp clips so as not to be obscured by any clip or the strap retained by the clips.~~

~~**11.5.12**~~

~~Any permanent attachment provided by the manufacturer to helmets shall not interfere with the function of the helmet or with the function of any of the helmet's component parts.~~

~~**11.5.13**~~

~~Where helmets are provided by the manufacturer with permanent attachments, the helmet shall meet all of the design and performance requirements of this standard with permanent attachments installed. In all cases, such permanent attachments shall not degrade the performance of the helmet.~~

~~**11.6** Emergency Medical Powered Air-Purifying Respirator Design Requirements.~~

~~**11.6.1***~~

~~The respirator shall be certified to the requirements of 42 CFR 84, "Approval of Respirator Protective Devices," and shall include a protection level of HE.~~

~~**A.11.6.1**~~

~~This standard relies on the certification of loose-fitting powered air-purifying respirators (PAPRs) by NIOSH as specified in 42 CFR 84, "Approval of Respirator Protective Devices," in addition to separate performance requirements for hood material, if part of the respirator, specified in 22.6.1. Current loose-fitting and tight-fitting (based on a tight-fitting facepiece) PAPRs are generally considered too heavy, bulky, and noisy for emergency medical operations. Commercial PAPRs developed specifically for health care applications overcome these issues by providing more appropriate levels of airflow, improved positioning of equipment, and other needs specific to health care applications identified in the Institute of Medicine's "The Use and Effectiveness of Powered Air Purifying Respirators in Healthcare." As of 2018, NIOSH is in the process of developing and implementing new requirements for medical PAPRs as part of ordinary rule-making efforts.~~

~~**11.7** Single-Use Emergency Medical Protective Ensemble Design Requirements.~~

~~**11.7.1***~~

~~Ensemble elements to be specified by the manufacturer shall include a specific single-use emergency medical protective garment, the use of any NFPA 1999 –certified single-use emergency medical examination gloves (two pairs — inner and outer), specific multiple-use emergency medical footwear, multiple-use medical care facility footwear or single-use emergency medical footwear covers, specific eye and face protection devices, and at least a specific filtering facepiece respirator.~~

~~**A.11.7.1**~~

~~See A.3.3.144, Single-Use Emergency Medical Protective Ensemble.~~

~~**11.7.1.1**~~

~~Emergency medical protective footwear shall be permitted to include any footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 .~~

~~**11.7.1.2**~~

~~If the ensemble garment is configured with a sock that is constructed of garment material and covers the wearer's foot and ankle, then any footwear meeting ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear* , shall be permitted to be specified in conjunction with the garment.~~

~~**11.7.1.3***~~

~~Eye and face protection devices shall be permitted to include goggles and faceshields that only meet ANSI Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices* , requirements when marked for splash/droplet use.~~

~~**A.11.7.1.3**~~

~~Multiple-use emergency medical eye and face protective devices are already required to meet the respective requirements of ANSI Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices.* The ANSI Z87.1 standard already includes criteria that address other areas of performance such as ignition and droplet/splash protection. Goggles and faceshields meeting these requirements are marked for splash/droplet use using the "D3" marking.~~

~~**11.7.1.4***~~

~~The filtering facepiece respirator shall be a NIOSH-approved filtering facepiece in accordance with 42 CFR 84, "Approval of Respiratory Protective Devices," that also meets the requirements of ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks* , or a surgical N95 filtering facepiece respirator that is a NIOSH-approved N95 respirator that has also been cleared by the U.S. Food and Drug Administration as a surgical mask.~~

~~**A.11.7.1.4**~~

~~ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks* , addresses performance including bacterial filtration efficiency, differential pressure, submicron particulate filtration efficiency, resistance to penetration by synthetic blood, and flame spread. Surgical N95 filtering facepiece respirators are respirators approved by NIOSH as N95 filtering facepieces in accordance with Title 42, CFR Part 84, "Approval of Respiratory Protective Devices," in addition to medical devices cleared by the U.S Food and Drug Administration as a surgical mask in accordance with Title 21, CFR Subpart E, Section 878.4040, "Surgical Devices." Surgical N95 respirators are listed by NIOSH at www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource3healthcare.html#e.~~

~~**11.7.1.5***~~

~~The manufacturer shall be permitted to specify respirators that meet the requirements in 11.8.1.4 .~~

~~**A.11.7.1.5**~~

~~The purpose of this requirement is to allow the manufacturer to specify respirators other than filtering facepieces described in 11.7.1.4 .~~

~~**11.7.1.6***~~

~~The use of a specific tape specified by the manufacturer shall be permitted for securing items in interface areas.~~

~~**A.11.7.1.6**~~

~~Tape is permitted only where the manufacturer identifies a specific tape, where the tape is used to secure interface areas and the tape does not serve as the primary liquid or viral penetration resistance barrier, and the manufacturer provides detailed instructions for its application as part of the required user information.~~

~~**11.7.1.7**~~

~~Where the outer single-use emergency medical examination gloves are physically attached to the single-use emergency medical garment, it shall be permitted to exclude the inner single-use examination gloves.~~

~~**11.7.1.8**~~

~~Specific cleaning/utility gloves shall be permitted to be substituted by the manufacturer for the outer pair of NFPA 1999 -certified single user emergency medical examination gloves.~~

~~**11.8** Multiple-Use Emergency Medical Protective Ensemble Design Requirements.~~

~~**11.8.1***~~

~~Ensemble elements to be specified by the manufacturer shall include a specific multiple-use emergency medical protective garment, specific single-use emergency medical cleaning/utility or multiple-use emergency medical work gloves worn over any NFPA 1999 –certified single-use medical emergency examination gloves, specific multiple-use emergency medical footwear, or multiple-use medical facility footwear, and specific full facepiece respirator(s).~~

~~A.11.8.1~~

~~See A.3.3.114, Multiple-Use Emergency Medical Protective Ensemble.~~

~~11.8.1.1~~

~~Emergency medical protective footwear shall be permitted to include any footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 .~~

~~11.8.1.2~~

~~If the ensemble is specified with multiple-use emergency medical work gloves and the work glove design relies on either a single-use examination glove or a single-use emergency medical cleaning/utility glove for the barrier protection, or the work glove consists of a separable liner that is attached to the sleeve of the ensemble garment element, then an additional NFPA 1999 –certified single-use medical emergency examination glove shall not be required as part of the ensemble.~~

~~11.8.1.3~~

~~If the garment is configured with a bootie that is constructed of garment material and covers the wearer's foot and ankle, then any footwear meeting ASTM F2413 shall be permitted to be specified in conjunction with the garment.~~

~~11.8.1.4~~

~~Full-face respirators shall be NIOSH-approved as either a full-facepiece, air-purifying respirator with minimum protection level of P100 or an appropriate tight- or loose-fitting NIOSH-approved powered air-purifying respirator with a protection level of HE. All respirators shall be approved in accordance with 42 CFR 84, "Approval of Respiratory Protective Devices."~~

~~11.8.1.5~~

~~Where a loose-fitting powered air-purifying respirator (PAPR) is specified, the materials used in the construction of the hood shall meet the garment material performance requirements specified in 12.1.1 , except 12.1.1.6 .~~

Submitter Information Verification

Committee: FAE-EMS
Submittal Date: Mon Nov 09 11:16:47 EST 2020

Committee Statement

Committee Statement: The NFPA Standards Council approved the technical committee's request to remove NFPA 1999 from the consolidated NFPA 1990 document. This section is being removed as it pertains specifically to NFPA 1999.

Response Message: SR-99-NFPA 1990-2020

Public Comment No. 12-NFPA 1990-2020 [Chapter 11]

Public Comment No. 247-NFPA 1990-2020 [Sections A.11.1.1.2, A.11.1.1.5, A.11.1.1.6, A.11.1.1.7, A....]

Ballot Results

This item has passed ballot

17 Eligible Voters
6 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Area, James B.

Billings, Lincoln

Bogucki, Sandy

Davis, James E.

Davis, Todd P.

Patrick, Richard W.

Affirmative All

Fithian, William A.

Freeman, Patricia A.

Hickerson, Barry L.

Horowitz, Jason

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Newsom, Amanda H.

Sadtler, Jeff

Stull, Jeffrey O.

Second Revision No. 100-NFPA 1990-2020 [Chapter 12]

12-deleted ~~Performance Requirements (NFPA 1999)-DELETED~~

~~**12.1** Emergency Medical Garment Performance Requirements.~~

~~**12.1.1*** Single-Use Emergency Medical Garment Performance Requirements.~~

~~**A.12.1.1**~~

~~The performance criteria for single-use garments are based on the same level of material biopenetration resistance and overall garment integrity as for multiple-use garments; however, a lower level of physical property performance (tensile strength, burst strength, tear resistance, puncture propagation tear resistance, and seam strength) is defined, since it is expected that single-use garments are used for shorter periods as compared with multiple-use garments.~~

~~**12.1.1.1**~~

~~Full body or full torso garments, including, but not limited to, coveralls, coats, jackets, pants, and overalls, shall be tested for liquidtight integrity as specified in Section 13.2 and shall allow no water penetration.~~

~~**12.1.1.2**~~

~~Garment barrier layer material and barrier layer seams shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall exhibit no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.1.1.3**~~

~~Garment materials, excluding interface materials, and interface components, shall be tested for bursting strength as specified in Section 13.5 and shall have a bursting strength of not less than 66 N (14.9 lbf).~~

~~**12.1.1.4**~~

~~Garment materials, excluding interface materials, and interface components, shall be tested for puncture resistance as specified in Section 13.6 and shall have a puncture resistance of not less than 12 N (2.7 lbf).~~

~~**12.1.1.5**~~

~~Garment material seams, excluding visors, interface materials, and interface components, shall be tested for breaking strength as specified in Section 13.8 and shall have a breaking strength of not less than 50 N (11.2 lbf).~~

~~**12.1.1.6**~~

~~Garment materials for full body garments including, but not limited to, coveralls and full torso and limb encapsulating garments, but excluding visors, interface materials, and interface components, shall be tested for evaporative resistance moisture vapor transmission rates as specified in Section 8.42 and shall have an evaporative resistance of not greater than 25 Pa~~ ~~m^2 /W.~~

~~**12.1.1.7**~~

~~Garment materials shall be tested for flammability as specified in Section 13.34 and shall have a flame spread time of 3.5 seconds or more.~~

~~**12.1.1.8**~~

~~Full body garments that at least cover the upper and lower torso, arms, and legs shall be tested for overall function as specified in Section 13.39 , shall allow the test subject to complete all tasks within 15 minutes, and shall allow no liquid penetration in subsequent liquidtight integrity testing as specified in Section 13.2 , and the garment closure shall remain engaged during the entire garment function testing.~~

~~**12.1.1.8.1**~~

~~Where the garment element includes a hood with a visor, the garment shall permit the test subject to properly identify three out of four numbers on the NFPA 704 -based placard at each of the following angles: upward 36 degrees, downward 30 degrees, and right and left 60 degrees.~~

~~**12.1.1.8.2**~~

~~Where the garment element includes a hood with a visor, the ensemble shall permit the test subject to see with a visual acuity of 20/35 or better through the combination of the hood visor and the respirator facepiece lens.~~

~~**12.1.1.8.3**~~

~~Where protective flaps cover the closure, the protective flaps shall remain closed for the duration of the overall garment function test.~~

~~**12.1.1.8.4**~~

~~The liquidtight integrity evaluation conducted as part of this testing shall be permitted to replace the testing required in 12.1.1.1 .~~

~~**12.1.2** Multiple-Use Emergency Medical Garment Performance Requirements.~~

~~**12.1.2.1**~~

~~Garments shall be tested for liquidtight integrity as specified in Section 13.2 and shall allow no water penetration.~~

~~**12.1.2.2**~~

~~Barrier layer material and barrier layer seams shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall exhibit no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.1.2.3**~~

~~Each separable layer of garment material, excluding visors, interface materials, and interface components, shall be tested for tensile strength as specified in Section 13.4 and shall have a tensile strength of not less than 225.5 N (50 lbf).~~

~~**12.1.2.4**~~

~~Each separable layer of garment material, excluding visors, interface materials, and interface components, shall be tested for bursting strength as specified in Section 13.5 and shall have a bursting strength of not less than 178 N (40 lbf).~~

~~**12.1.2.5**~~

~~Each separable layer of garment material, excluding visors, interface materials, and interface components, shall be tested for puncture propagation tear resistance as specified in Section 13.6 and shall have a puncture resistance of not less than 25 N (5 ½ lbf).~~

~~**12.1.2.6**~~

~~Each separable layer of garment material, excluding visors, interface materials, and interface components, shall be tested for tear strength as specified in Section 13.7 and shall have a tear strength of not less than 36 N (8 lbf).~~

~~**12.1.2.7**~~

~~Seams from each separable layer of garment material, excluding visors, interface materials, and interface components, shall be tested for breaking strength as specified in Section 13.8 and shall have a breaking strength of not less than 222.5 N (50 lbf).~~

~~**12.1.2.7.1**~~

~~Seam breaking strength shall be considered acceptable where the material strength is less than the required seam strength specified in 12.1.2.7 , provided the material fails without failure of the seam below the applicable forces specified in 12.1.2.7 .~~

~~**12.1.2.8**~~

~~Garment material, excluding visors, interface materials, and interface components, shall be tested for water absorption resistance as specified in Section 13.30 and shall have a percent water absorption of 30 percent or less.~~

~~**12.1.2.9**~~

~~Where garments includes include visors, the visor materials shall be tested for impact resistance as specified in Section 13.40 and shall not have a full thickness puncture, cracks, holes, or fractures.~~

~~**12.1.2.10**~~

~~Except for winter liners, garment materials or composites shall be tested for evaporative resistance as specified in Section 13.41 and shall have an evaporative resistance of not greater than 25 Pa m~~ ^{2} ~~/W.~~

~~**12.1.2.11**~~

~~Product labels of garments designated for multiple use shall be tested for durability and legibility as specified in Section 13.32 and shall remain in place and shall be legible.~~

~~**12.1.2.12**~~

~~All garment hardware and specimens of all garment hardware that include metal parts shall be individually tested for resistance to corrosion as specified in Section 13.22 and shall have metals that are inherently resistant to corrosion including, but not limited to, stainless steel, brass, copper, aluminum, and zinc show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have all hardware remain functional.~~

~~**12.1.2.13**~~

~~Where visibility materials are used on garments and the garment is intended to provide high visibility of the wearer in accordance with the requirement in 11.1.2.8 , the background, retroreflective, and combined performance materials shall meet the requirements of ANSI/ISEA 107,~~ ~~*American National Standard for High-Visibility Safety Apparel and Accessories*~~ ~~.~~

~~**12.1.2.14**~~

~~Fastener tape shall be tested for breaking strength as specified in Section 13.38 and shall meet or exceed the minimum breaking strength requirements as established in Table 1 of A-A-55126B,~~ ~~*Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic*~~ ~~.~~

~~**12.1.2.15**~~

~~Fastener tape shall be tested for shear strength as specified in Section 13.38 and shall meet or exceed the minimum shear strength requirements as established in Table 1 of A-A-55126B,~~ ~~*Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic*~~ ~~.~~

~~**12.1.2.16**~~

~~Fastener tape shall be tested for peel strength as specified in Section 13.38 and shall meet or exceed the minimum peel strength requirements as established in Table 1 of A-A-55126B,~~ ~~*Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic*~~ ~~.~~

~~**12.1.2.17**~~

~~Garment zippers shall be tested for crosswise breaking strength of chain; crosswise breaking strength of separating unit; holding strengths of stops, retainers, and separating units; operating force; and slider lock strength requirements of A-A-55634B,~~ ~~*Commercial Item Description — Zippers (Fasteners, Slide Interlocking)*~~ ~~.~~

~~**12.1.2.18**~~

~~Full body garments that at least cover the upper and lower torso, arms, and legs shall be tested for overall function as specified in Section 13.39, shall allow the test subject to complete all tasks within 15 minutes, and shall allow no liquid penetration in subsequent liquidtight integrity testing as specified in Section 13.2, and the garment closure shall remain engaged during the entire garment function testing.~~

~~12.1.2.18.1~~

~~Where the garment element includes a hood with a visor, the garment shall permit the test subject to properly identify three out of four numbers on the NFPA 704 -based placard at each of the following angles: upward 36 degrees, downward 30 degrees, and right and left 60 degrees.~~

~~12.1.2.18.2~~

~~Where the garment element includes a hood with a visor, the garment shall permit the test subject to see with a visual acuity of 20/35 or better through the combination of the hood visor and the respirator facepiece lens.~~

~~12.1.2.18.3~~

~~Where protective flaps cover the closure, the protective flaps shall remain closed for the duration of the overall garment function test.~~

~~12.1.2.18.4~~

~~The liquidtight integrity evaluation conducted as part of this testing shall be permitted to replace the testing required in 12.1.2.1 .~~

~~12.1.2.19~~ ~~Garment Socks.~~

~~12.1.2.19.1~~

~~Where garment sock materials are different from the garment material, the garment sock material shall be tested for tensile strength in accordance with Section 13.4 and shall have a tensile strength of not less than 50 N (11.2 lbf).~~

~~12.1.2.19.2~~

~~Where garment sock materials are different from the garment material, the garment sock material shall be tested for bursting strength in accordance with Section 13.5 and shall have a burst strength of not less than 66 N (14.9 lbf).~~

~~12.1.2.19.3~~

~~Where garment sock materials are different from the garment material, the garment sock material shall be tested for puncture resistance in accordance with Section 13.6 and shall have a puncture resistance of not less than 12 N (2.7 lbf).~~

~~12.1.2.19.4~~

~~Where garment sock materials are different from the garment material, the garment sock material shall be tested for tear strength in accordance with Section 13.7 and shall have a tear strength of not less than 17 N (3.8 lbf).~~

~~12.1.2.19.5~~

~~Where garment sock material seams are different from the garment material seams, the garment sock material seams shall be tested for seam breaking strength in accordance with Section 13.8 and shall have a seam breaking strength of not less than 50 N (11.2 lbf).~~

~~12.2~~ ~~Emergency Medical Glove Performance Requirements.~~

~~12.2.1~~ ~~Single-Use Emergency Medical Examination Glove Performance Requirements.~~

~~12.2.1.1~~

~~Examination gloves shall be tested for liquidtight integrity as specified in Section 13.9 and shall have an acceptable quality limit of 1.5 or better.~~

~~12.2.1.2~~

~~Examination gloves shall be tested for body fluid–borne pathogen resistance as specified in Section 13.10 and shall exhibit no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~12.2.1.3~~

~~Examination glove material shall be tested for tensile strength as specified in Section 13.11 and shall have an ultimate tensile strength of not less than 14 MPa (2000 psi).~~

~~12.2.1.4~~

~~Examination glove material shall be tested for elongation as specified in Section 13.12 and shall have an ultimate elongation of not less than 400 percent.~~

~~12.2.1.5~~

~~Examination glove material shall be tested for puncture resistance as specified in Section 13.13 and shall have a puncture resistance of not less than 4.5 N (1 lbf).~~

~~12.2.1.6~~

~~Examination gloves shall be tested for dexterity as specified in Section 13.14 and shall have test times no greater than 120 percent of baseline test measurements.~~

~~12.2.1.7~~

~~Natural latex rubber examination glove material shall be tested for protein levels as specified in Section 13.15 and shall have protein levels no greater than 50 µg/g (50 ppm).~~

~~**12.2.2** Single-Use Emergency Medical Cleaning/Utility Glove Performance Requirements.~~

~~12.2.2.1~~

~~Cleaning/utility gloves shall be tested for liquidtight integrity as specified in Section 13.9 and shall show no leakage.~~

~~12.2.2.2~~

~~Cleaning/utility gloves shall be tested for body fluid–borne pathogen resistance as specified in Section 13.10 and shall exhibit no penetration of Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~12.2.2.3~~

~~Cleaning/utility glove materials shall be tested for permeation resistance as specified in Section 13.24 and shall not have a cumulative permeation of greater than 6 µg/cm^2 for each chemical tested.~~

~~12.2.2.4~~

~~Cleaning/utility glove materials shall be tested for tensile strength as specified in Section 13.11 and shall have an ultimate tensile strength of greater than 10.3 MPa (1500 psi).~~

~~12.2.2.5~~

~~Cleaning/utility glove materials shall be tested for puncture resistance as specified in Section 13.13 and shall have a puncture resistance of greater than 9 N (2 lbf).~~

~~12.2.2.6~~

~~Cleaning/utility gloves shall be tested for resistance to cut as specified in Section 13.18 and shall have a blade travel distance not less than 20 mm (0.8 in.).~~

~~12.2.2.7~~

~~Cleaning/utility glove materials shall be tested for abrasion resistance as specified in Section 13.25 and shall not show wear-through after 1000 cycles.~~

~~12.2.2.8~~

~~Cleaning/utility gloves shall be tested for dexterity as specified in Section 13.26 and shall have an average percent of barehanded control not exceeding 200 percent.~~

~~**12.2.2.9**~~

~~Cleaning/utility gloves shall be tested for tactility as specified in Section 13.29 and shall permit pick-up of pins having a diameter of 5 mm (0.2 in.) or less.~~

~~**12.2.3** Multiple-Use Emergency Medical Work Glove Performance Requirements.~~

~~**12.2.3.1**~~

~~Work gloves shall be tested for liquidtight integrity as specified in Section 13.28 and shall show no water penetration.~~

~~**12.2.3.2**~~

~~Work gloves shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall show no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.2.3.3**~~

~~Work glove body materials shall be tested for puncture resistance as specified in Section 13.13 and shall not puncture under an applied force of 9 N (2 lbf).~~

~~**12.2.3.4**~~

~~Work glove body and interface component materials shall be tested for resistance to cut as specified in Section 13.18 and shall have a blade travel distance of not less than 20 mm (0.8 in.).~~

~~**12.2.3.5**~~

~~Work glove body composite materials shall be tested for abrasion resistance as specified in Section 13.25 and shall show no wear-through.~~

~~**12.2.3.6**~~

~~Gloves shall be tested for hand function as specified in Section 13.26 and shall have an average percent of barehanded control not exceeding 200 percent.~~

~~**12.2.3.7**~~

~~Work gloves shall be tested for grip as specified in Section 13.27 and shall have an average percentage of bare-handed control not less than 65 percent.~~

~~**12.2.3.8**~~

~~Work gloves shall be tested for tactility as specified in Section 13.29 and shall permit pick-up of pins having a diameter of 8 mm (0.3 in.) or less.~~

~~**12.2.3.9**~~

~~All metal hardware and hardware that includes metal parts shall be tested for corrosion resistance as specified in Section 13.22 and shall have metals that are inherently resistant to corrosion, including, but not limited to, stainless steel, brass, copper, aluminum, and zinc show no more than light surface-type corrosion or oxidation; shall have ferrous metals show no corrosion of the base metal; and shall have hardware items remain functional.~~

~~**12.2.3.10**~~

~~Product labels shall be tested for durability and legibility as specified in Section 13.32 and shall be legible.~~

~~**12.2.3.11**~~

~~If the work glove is configured with a separable inner glove, and the inner glove is a single-use emergency medical examination glove, then the inner glove shall meet all the performance requirements in 12.2.1. Testing specified in 12.2.3.1 and 12.2.3.2 shall not be performed.~~

~~**12.2.3.12**~~

~~If the work glove is configured with a separable inner glove, and the inner glove is a single-use emergency medical cleaning/utility glove, then the inner glove shall meet all the performance requirements in 12.2.2 . Testing specified in 12.2.3.1 and 12.2.3.2 shall not be performed.~~

~~**12.3*** Emergency Medical Eye and Face Protection Device Performance Requirements.~~

~~**A.12.3**~~

~~See A.11.3 .~~

~~**12.3.1** Single-Use Emergency Medical Facemask Performance Requirements.~~

~~**12.3.1.1**~~

~~Medical facemasks shall meet the Level 3 barrier requirements for medical facemasks in accordance with Table 1 and Section 6 of ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks.*~~

~~**12.3.1.2**~~

~~Medical facemasks shall be tested for liquidtight integrity as specified in Section 13.17 and shall allow no liquid penetration.~~

~~**12.3.2** Single-Use Emergency Medical Eye and Face Protection Device Performance Requirements.~~

~~**12.3.2.1**~~

~~These requirements shall apply to eye and face protection devices that are not medical facemasks or eye and face protection devices that incorporate medical facemask-like designs, which are intended for single use only.~~

~~**12.3.2.2**~~

~~If the portion of the eye and face protection device covering the eyes and face is not a continuous plastic or solid film, materials used in the construction of eye and face protection devices, except straps used to secure the device on the wearer's head, shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall exhibit no penetration of the Phi-X174 bacteriophage.~~

~~**12.3.2.3**~~

~~Eye and face protection devices shall be tested for liquidtight integrity as specified in Section 13.17 and shall allow no liquid penetration.~~

~~**12.3.2.4**~~

~~Eye and face protection devices that cover the eyes or affect the vision of the wearer shall be tested for visual acuity as specified in Section 13.16 and shall permit test subjects to read at least the 20/35 visual acuity line or better and shall have the eye and face protection device be able to be donned and adjusted in accordance with manufacturer's instructions.~~

~~**12.3.2.5**~~

~~Each textile layer used in the construction of the eye and face protection device shall be tested for flammability as specified in Section 13.34 and shall have a flame spread time of 3.5 seconds or more.~~

~~**12.3.3** Multiple-Use Emergency Medical Eye and Face Protection Device Performance Requirements.~~

~~**12.3.3.1**~~

~~Eye and face protection devices that involve junctures or interfaces between different items that are not continuous in their design shall be tested for liquidtight integrity as specified in Section 13.17 and shall allow no liquid penetration.~~

~~**12.3.3.2**~~

~~Unless corrosion resistance is already evaluated in another requirement, all eye and face protection device hardware and specimens of all face protection device hardware that include metal parts shall be individually tested for resistance to corrosion as specified in Section 13.22 , and shall have metals that are inherently resistant to corrosion including, but not limited to, stainless steel, brass, copper, aluminum, and zinc, show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have all hardware remain functional.~~

~~**12.4** Emergency Medical Footwear Performance Requirements.~~

~~**12.4.1** Single-Use Emergency Medical Footwear Cover Performance Requirements.~~

~~**12.4.1.1**~~

~~Footwear cover materials and seams shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall show no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.4.1.2**~~

~~Footwear cover upper materials shall be tested for tensile strength as specified in Section 13.4 and shall have a tensile strength of not less than 50 N (11.2 lbf).~~

~~**12.4.1.3**~~

~~Footwear cover upper materials shall be tested for bursting strength as specified in Section 13.5 and shall have a bursting strength of not less than 66 N (14.9 lbf).~~

~~**12.4.1.4**~~

~~Footwear cover material seams shall be tested for breaking strength as specified in Section 13.8 and shall have a breaking strength of not less than 50 N (11.2 lbf).~~

~~**12.4.1.5**~~

~~Footwear cover wear surface materials shall be tested for abrasion resistance as specified in Section 13.25 and shall show no wear-through.~~

~~**12.4.1.6**~~

~~The footwear cover wear surface materials shall be tested for puncture resistance as specified in Section 13.13 and shall have a puncture force greater than 8 N (1.8 lbf).~~

~~**12.4.1.7**~~

~~The footwear cover wear surface materials shall be tested for slip resistance as specified in Section 13.20 and shall have a coefficient of friction of 0.40 or greater.~~

~~**12.4.1.8**~~

~~Footwear cover materials shall be tested for flammability as specified in Section 13.34 and shall have a flame spread time of 3.5 seconds or more.~~

~~**12.4.2** Multiple-Use Emergency Medical Footwear Performance Requirements.~~

~~**12.4.2.1**~~

~~Footwear uppers shall be tested for cut resistance as specified in Section 13.18 and shall have a blade travel distance not less than 20 mm (0.8 in.).~~

~~**12.4.2.2**~~

~~Footwear uppers shall be tested for puncture resistance as specified in Section 13.13 and shall not puncture under an applied force of 45 N (10 lbf).~~

~~**12.4.2.3**~~

~~Footwear soles and heels shall be tested for abrasion resistance as specified in Section 13.19 and the relative volume loss shall not be greater than 250 mm~~ ^{3} ~~.~~

~~**12.4.2.4**~~

~~Footwear outer soles shall be tested for slip resistance as specified in Section 13.20 and shall have a coefficient of friction of 0.40 or greater.~~

~~**12.4.2.5**~~

~~Eyelets and stud hooks shall be tested for attachment strength as specified in Section 13.21 and shall have a minimum detachment strength of 295 N (66 lbf).~~

~~**12.4.2.6**~~

~~All footwear metal hardware and specimens of all footwear hardware that include metal parts shall be individually tested for resistance to corrosion as specified in Section 13.22 and shall have metals that are inherently resistant to corrosion including, but not limited to, stainless steel, brass, copper, aluminum, and zinc show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have all hardware remain functional.~~

~~**12.4.2.7**~~

~~The barrier layer material and barrier layer seams in the footwear shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall show no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.4.2.8**~~

~~Footwear shall be tested for overall watertight integrity as specified in Section 13.23 and shall allow no liquid penetration, and the outer sole shall not separate.~~

~~**12.4.2.9**~~

~~Product labels shall be tested for durability and legibility as specified in Section 13.32 and shall be legible.~~

~~**12.4.2.10**~~

~~Footwear shall meet the performance requirements as specified in ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*, for impact, compression, and puncture-resistant footwear, with the exception that flex resistance to cracking shall not be evaluated.~~

~~**12.4.3** Multiple-Use Medical Care Facility Footwear Performance Requirements.~~

~~**12.4.3.1**~~

~~Footwear uppers shall be tested for cut resistance as specified in Section 13.18 and shall have a blade travel distance not less than 20 mm (0.8 in.).~~

~~**12.4.3.2**~~

~~Footwear uppers shall be tested for puncture resistance as specified in Section 13.13 and shall not puncture under an applied force of 45 N (10 lbf).~~

~~**12.4.3.3**~~

~~Footwear soles and heels shall be tested for abrasion resistance as specified in Section 13.19 and the relative volume loss shall not be greater than 250 mm~~ $\cancel{^3}$ ~~.~~

~~**12.4.3.4**~~

~~Footwear outer soles shall be tested for slip resistance as specified in Section 13.20 and shall have a coefficient friction of 0.40 or greater.~~

~~**12.4.3.5**~~

~~Eyelets and stud hooks shall be tested for attachment strength as specified in Section 13.21 and shall have a minimum detachment strength of 295 N (66 lbf).~~

~~**12.4.3.6**~~

~~All footwear metal hardware and specimen footwear hardware that include metal parts shall be individually tested for resistance to corrosion as specified in Section 13.22 and shall have metals that are inherently resistant to corrosion including, but not limited to, stainless steel, brass, copper, aluminum, and zinc show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have all hardware remain functional unless specifically excluded in this test method.~~

~~**12.4.3.7**~~

~~The barrier layer material and barrier layer seams in the footwear shall be tested for body fluid–borne pathogen resistance as specified in Section 13.3 and shall show no penetration of the Phi-X174 bacteriophage above the test interpretation threshold for one hour.~~

~~**12.4.3.8**~~

~~Footwear shall be tested for overall watertight integrity as specified in Section 13.23 and shall allow no liquid penetration, and the outer sole shall not separate.~~

~~**12.4.3.9**~~

~~Product labels shall be tested for durability and legibility as specified in Section 13.32 and shall be legible.~~

~~**12.5*** Multiple-Use Emergency Medical Helmet Performance Requirements.~~

~~**A.12.5**~~

~~See A.11.5 .~~

~~**12.5.1**~~

~~Helmet suspension systems shall be tested for separation as specified in Section 13.35 and shall not separate from the helmet, and the adjusting mechanism shall function properly.~~

~~**12.5.2**~~

~~Helmet chin straps shall be tested for retention system separation as specified in Section 13.36 and the chin strap shall not exhibit any breakage and shall not stretch or slip more than 38 mm (1 1⁄2 in.), and shall have all mechanisms function properly.~~

~~**12.5.3**~~

~~Where present, helmets with goggle or headlamp clips shall be tested for attachment strength as specified in Section 13.37 , the clips shall not release from the shell, and the clips shall not deflect more than 6 mm (1⁄4 in.) from their original position.~~

~~**12.5.4**~~

~~All helmet metal hardware and helmet hardware that include metal parts shall be individually tested for resistance to corrosion as specified in Section 13.22 and shall have metals that are inherently resistant to corrosion including, but not limited to, stainless steel, brass, copper, aluminum, and zinc show no more than light surface-type corrosion or oxidation, shall have ferrous metals show no corrosion of the base metal, and shall have all hardware remain functional.~~

~~**12.5.5**~~

~~Helmet visibility markings shall be tested for retroreflectivity as specified in Section 8.37 and shall have a coefficient of retroreflection (R_a) of not less than 100 cd/lux/m^2 (100 cd/fc/ft^2).~~

~~**12.6** Emergency Medical Powered Air-Purifying Respirator Performance Requirements.~~

~~**12.6.1**~~

~~Where a loose-fitting powered air-purifying respirator is specified, the materials used in the construction of the hood shall meet all garment material performance requirements specified in either 12.1.1 , except the requirement in 12.1.1.6 , or 12.1.2 , except the requirements in 12.1.2.9 and 12.1.2.10 .~~

~~**12.7** Single-Use Emergency Medical Protective Ensemble Performance Requirements.~~

~~**12.7.1**~~

~~Ensembles shall be tested for liquidtight integrity as specified in Section 13.2 and shall allow no water penetration.~~

~~**12.7.2**~~

~~Garment elements specified as part of the ensemble shall meet the requirements in 12.1.1 .~~

~~**12.7.3**~~

~~Glove elements specified as part of the ensemble that are not already certified to this standard shall meet the requirements in 12.2.1 .~~

~~**12.7.4**~~

~~Footwear elements specified as part of an ensemble that does not use socks as part of its design that are not already certified to this standard or another standard specified in 11.7.1.1 shall meet the respective requirements in Section 12.4 .~~

~~**12.7.5**~~

~~Eye and face protection devices that are not already certified to this standard or are not marked at least “Z87 D3” in accordance with ANSI/ISEA Z87.1. *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices* , shall meet the respective requirements in Section 12.3 .~~

~~**12.7.6**~~

~~Ensembles shall be tested for overall function as specified in Section 13.39 , shall allow the test subject to complete all tasks within 15 minutes, and shall allow no liquid penetration in subsequent liquidtight integrity testing as specified in Section 13.2 , and the garment closure shall remain engaged during the entire ensemble function testing.~~

~~**12.7.6.1**~~

~~Where the ensemble element includes a hood with a visor that covers the respirator facepiece, the ensemble shall permit the test subject to properly identify three out of four numbers on the NFPA 704 -based placard at each of the following angles: Upward 36 degrees, downward 30 degrees, and right and left 60 degrees.~~

~~**12.7.6.2**~~

~~Where the ensemble element includes a hood with a visor that covers the respirator facepiece, the ensemble shall permit the test subject to see with a visual acuity of 20/35 or better through the combination of the hood visor and the respirator facepiece lens.~~

~~**12.7.6.3**~~

~~Where protective flaps cover the closure, the protective flaps shall remain closed for the duration of the overall ensemble function test.~~

~~**12.7.6.4**~~

~~The liquidtight integrity evaluation conducted as part of this testing shall be permitted to replace the testing required in 12.7.1 .~~

~~**12.8** Multiple-Use Emergency Medical Protective Ensemble Performance Requirements.~~

~~**12.8.1**~~

~~Ensembles shall be tested for liquidtight integrity as specified in Section 13.2 and shall allow no water penetration.~~

~~**12.8.2**~~

~~Garment elements specified as part of the ensemble shall meet the requirements in 12.2.1 .~~

~~**12.8.3**~~

~~Glove elements specified as part of the ensemble that are not already certified to this standard shall meet the requirements in Section 12.2 .~~

~~**12.8.4**~~

~~Footwear elements specified as part of an ensemble that does not use socks as part of its design that are not already certified to this standard or another standard specified in 11.8.1.1 shall meet the respective requirements in Section 12.4 .~~

~~**12.8.5** Interface Material Requirements.~~

~~**12.8.5.1**~~

~~Where the ensemble includes elastomeric interface materials, each elastomeric interface material shall be tested for cut resistance as specified in Section 13.18 and shall have a blade travel distance of not less than 20 mm (0.8 in.).~~

~~**12.8.5.2**~~

~~Where the ensemble includes elastomeric interface materials, each elastomeric interface material shall be tested for puncture resistance as specified in Section 13.13 and shall have a puncture resistance of not less than 7 N (1.6 lbf).~~

~~**12.8.5.3**~~

~~Where the ensemble includes elastomeric interface materials, each elastomeric interface material shall be tested for ultimate tensile strength as specified in Section 13.11 and shall have an ultimate tensile strength of not less than 4 MPa (550 psi).~~

~~**12.8.5.4***~~

~~Elastomeric interface materials shall have an elongation at rupture of not less than 125 percent when tested as specified in Section 13.11 .~~

~~**A.12.8.5.4**~~

~~The requirement for 125 percent elongation is for the purpose of defining an interface material as elastomeric. If the material has less than a 125 percent elongation at rupture, then the criteria for 12.8.5 do not apply.~~

~~**12.8.6**~~

~~Ensembles shall be tested for overall function as specified in Section 13.39 , shall allow the test subject to complete all tasks within 15 minutes, and shall allow no liquid penetration in subsequent liquidtight integrity testing as specified in Section 8.2 , and the garment closure shall remain engaged during the entire ensemble function testing.~~

~~**12.8.6.1**~~

~~Where the ensemble element includes a hood with a visor that covers the respirator facepiece, the ensemble shall permit the test subject to properly identify three out of four numbers on the NFPA 704 -based placard at each of the following angles: upward 36 degrees, downward 30 degrees, and right and left 60 degrees.~~

~~**12.8.6.2**~~

~~Where the ensemble element includes a hood with a visor that covers the respirator facepiece, the ensemble shall permit the test subject to see with a visual acuity of 20/35 or better through the combination of the hood visor and the respirator facepiece lens.~~

~~**12.8.6.3**~~

~~Where protective flaps cover the closure, the protective flaps shall remain closed for the duration of the overall ensemble function test.~~

~~12.8.6.4~~

~~The liquidtight integrity evaluation conducted as part of this testing shall be permitted to replace the testing required in 12.8.1 .~~

Submitter Information Verification

Committee: FAE-EMS

Submittal Date: Mon Nov 09 11:17:51 EST 2020

Committee Statement

Committee Statement: The NFPA Standards Council approved the technical committee's request to remove NFPA 1999 from the consolidated NFPA 1990 document. This section is being removed as it pertains specifically to NFPA 1999.

Response Message: SR-100-NFPA 1990-2020

Public Comment No. 13-NFPA 1990-2020 [Chapter 12]

Public Comment No. 248-NFPA 1990-2020 [Sections A.12.1.1, A.12.3, A.12.5, A.12.8.5.4]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters
6 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Area, James B.

Billings, Lincoln

Bogucki, Sandy

Davis, James E.

Davis, Todd P.

Patrick, Richard W.

Affirmative All

Fithian, William A.

Freeman, Patricia A.

Hickerson, Barry L.

Horowitz, Jason

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Newsom, Amanda H.

Sadtler, Jeff

Stull, Jeffrey O.

Second Revision No. 101-NFPA 1990-2020 [Chapter 13]

13-deleted ~~Test Methods (NFPA 1999)-DELETED~~

~~**13.1** Sample Preparation Procedures.~~

~~**13.1.1** Application.~~

~~**13.1.1.1**~~

~~The sample preparation procedures contained in this section shall apply to each test method in this chapter, as specifically referenced in the sample preparation section of each test method.~~

~~**13.1.1.2**~~

~~Only the specific sample preparation procedure(s) procedures referenced in the sample preparation section of each test method shall be applied to that test method.~~

~~**13.1.2** Room Temperature Conditioning Procedure for Garments, Gloves, and Face Protection Devices.~~

~~**13.1.2.1**~~

~~Samples shall be conditioned at a temperature of 21°C ± 3°C (70°F ± 5°F) and a relative humidity of 65 percent ± 5 percent, until equilibrium is reached, as determined in accordance with ASTM D1776/D1776M, *Standard Practice for Conditioning and Testing Textiles,* or for at least 24 hours.~~

~~**13.1.2.2**~~

~~Specimens shall be tested within 5 minutes after removal from conditioning.~~

~~**13.1.3** Washing and Drying Procedure for Complete Garments, Work Gloves, and Work Glove Pouches.~~

~~**13.1.3.1**~~

~~When laundering complete garments, the garment shall be washed with all closures fastened.~~

~~**13.1.3.2**~~

~~A commercial front-loading washer/extractor shall be used.~~

~~**13.1.3.3**~~

~~Two-thirds of the rated capacity of the washer shall be used.~~

~~**13.1.3.3.1**~~

~~If ballast is needed to reach the minimum load size, materials similar to the test material shall be used.~~

~~**13.1.3.3.2**~~

~~Two-thirds of the rated capacity of the washer shall not be exceeded.~~

~~**13.1.3.4**~~

~~The wash cycle procedure in Table 13.1.3.4 shall be followed.~~

~~Table 13.1.3.4 Wash Cycle Procedure for Complete Garments, Work Gloves, and Work Glove Pouches~~

~~Operation~~	~~Time (min)~~	~~Temperature °C~~	~~Temperature °F~~	~~Water Level~~
~~Suds using AATCC Detergent #1993, 1.0 g/4 L (1 gal) water~~	~~10~~	~~49~~	~~120~~	~~Low~~
~~Drain~~	~~1~~	—	—	—
~~Carry-over~~	~~5~~	~~49~~	~~120~~	~~Low~~
~~Drain~~	~~1~~	—	—	—
~~Rinse~~	~~2~~	~~38~~	~~100~~	~~High~~
~~Drain~~	~~1~~	—	—	—
~~Rinse~~	~~2~~	~~38~~	~~100~~	~~High~~
~~Drain~~	~~1~~	—	—	—
~~Rinse~~	~~2~~	~~38~~	~~100~~	~~High~~
~~Drain~~	~~1~~	—	—	—
~~Extract~~	~~5~~	—	—	—

~~13.1.3.4.1~~

~~Water temperature shall be within ± 3°C (± 5°F) of the value in the table.~~

~~13.1.3.4.2~~

~~Low water level shall be 12.7 cm ± 1 cm (5.0 in ± 3⁄8 in.) and high water level shall be 25.4 cm ± 1 cm (10.0 in ± 3⁄8 in.).~~

~~13.1.3.4.3~~

~~In addition, the g force shall not exceed 100 g throughout the wash cycle.~~

~~13.1.3.5~~

~~Samples shall be dried using a tumble dryer with a stack temperature of 38°C to 49°C (100°F to 120°F) when measured on an empty load 20 minutes into the drying cycle.~~

~~13.1.3.6~~

~~Complete garments and garment samples shall be tumbled for a minimum of 30 minutes or until samples are completely dry and shall be removed immediately at the end of the drying cycle.~~

~~13.1.3.6.1~~

~~At the conclusion of the final drying cycle, the complete garment and garment samples shall be allowed to air dry for at least 48 hours prior to conducting the test.~~

~~13.1.3.7~~

~~Work gloves and work glove pouches shall be tumbled for 60 minutes and shall be removed immediately at the end of the drying cycle.~~

~~13.1.3.7.1~~

~~At the conclusion of the final drying cycle, the glove shall be dried on a forced air non-tumble-drying mechanism operated at 10°C ± 5°C (18°F ± 9°F) above current room temperature until completely dry.~~

~~13.1.3.8~~

~~Samples shall be washed and dried for a total of 10 wash cycles and 10 drying cycles.~~

~~**13.1.3.9**~~

~~Where work gloves used in conjunction with multiple-use ensembles consist of two separate gloves with the inner glove attached to the garment, the outer glove shall not be required to be washed and dried in accordance with 13.1.3.8 .~~

~~**13.1.3.10**~~

~~Specimens shall be subjected to 10 cycles of washing and drying in accordance with the procedure specified in Machine Cycle 1, Wash Temperature V, and Drying Procedure Ai of AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics* .~~

~~**13.1.3.10.1**~~

~~When there are dimensional changes in automatic home laundering of woven and knit fabrics, a 1.8 kg ± 0.1 kg (4.0 lb ± 0.2 lb) load shall be used.~~

~~**13.1.3.10.2**~~

~~A laundry bag shall not be used.~~

~~**13.1.4** Isopropanol Immersion Procedure for Gloves.~~

~~**13.1.4.1**~~

~~Glove specimens shall be cut from the sample prior to conditioning. Glove specimens shall be totally immersed in 100 percent isopropanol at room temperature for a period of 2 hours.~~

~~**13.1.4.2**~~

~~Glove specimens shall be removed from the isopropanol, hung in a vertical position for 5 minutes, laid horizontal with AATCC textile blotting paper both under and over the sample, under a weight of 2 µg/cm^2 ± 0.2 g/cm^2 (1⁄2 psi ± 0.05 psi), for a period of 20 minutes as specified in AATCC 70, *Test Method for Water Repellency: Tumble Jar Dynamic Absorption* .~~

~~**13.1.4.3**~~

~~Specimens shall be tested within 5 minutes following blotting.~~

~~**13.1.5** Heat Aging Procedure for Gloves.~~

~~**13.1.5.1**~~

~~Glove samples shall be subjected to heat aging in accordance with ASTM D573, *Standard Test Method for Rubber — Deterioration in an Air Oven,* at a temperature of 70°C ± 2°C (158°F ± 4°F) for 166 hours ± 2 hours.~~

~~**13.1.5.2**~~

~~The sample gloves shall be allowed to cool for 10 minutes ± 1 minute, prior to testing.~~

~~**13.1.6** Abrasion Procedure for Garment Labels.~~

~~Labels shall be subjected to abrasion in accordance with ASTM D4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method),* with the modifications in 13.1.6.1 through 13.1.6.3 .~~

~~**13.1.6.1**~~

~~The standard abrasive fabric and the felt-backing fabric shall be soaked for 24 hours or agitated in distilled water so that they are thoroughly wet.~~

~~**13.1.6.2**~~

~~The standard abrasive fabric shall be rewetted after each set of cycles by applying 20 ml (0.68 oz) of distilled water from a squeeze bottle by squirting on the center of the abrasive composite pad.~~

~~**13.1.6.3**~~

~~Specimens shall be subjected to 200 cycles, 3200 revolutions, of the test apparatus.~~

~~**13.1.7** Wet Conditioning for Work Gloves.~~

~~**13.1.7.1**~~

~~Test subjects shall be selected such that their hand dimensions are as close as possible to those specified in accordance with manufacturing glove-sizing guidelines.~~

~~**13.1.7.2**~~

~~The wrist crease location shall be marked as described in 11.2.3.3 on each specimen around the entire glove +0/−3 mm (+0/−0.25 in.). Then, in the same manner, the water height line shall also be marked on each specimen 25 mm (1 in.) +0/−3 mm (+0/−0.25 in.) below (towards the fingers) the location of the wrist crease around the entire glove.~~

~~**13.1.7.3**~~

~~The test subject shall don the test specimen gloves.~~

~~**13.1.7.4**~~

~~The test subject shall immerse the donned specimens straight down into two containers of water at a temperature of 21°C ± 3°C (70°F ± 5°F) to the water height line for 15 seconds +1.5/−0 seconds.~~

~~**13.1.7.5**~~

~~The glove specimens shall be tested within 1 minute.~~

~~**13.1.8*** Work Glove Test Areas.~~

~~**A.13.1.8**~~

~~When a glove is two dimensional rather than three dimensional (the glove in Figure 13.1.8.1 is three dimensional), then the same methodology should be applied to the two-dimensional glove. For example, if there are requirements for the sides of the fingers, then the area of the glove that would cover the sides of the fingers should be considered for these requirements even though the glove does not have forchettes.~~

~~When wearing a correctly sized glove and laying the gloved hand completely flat on an even, flat surface, the portion of the glove that comes in contact with the even, flat surface should be considered the palm test areas of the glove. The layers immediately above the palm areas should be considered the areas next to the palm areas.~~

~~The finger sides should include the interior side areas of the small, ring, middle, and index fingers for a glove, that are hidden from sight, as observed both from the glove palm and glove back sides, when an individual wearing a correctly sized glove has his or her fingers completely closed.~~

~~The back area is intended to include all parts of the glove that are not defined as the palm area or the side areas. The layers immediately beneath the back areas should be considered the side areas next to the back areas.~~

~~13.1.8.1~~

~~Work glove test areas shall be as described below and shown in Figure 13.1.8.1 . Work glove test area abbreviations shall be as follows: P = Palm; B = Back; S = Side.~~

~~A-P: Palm side of hand from finger crotch line to 1⁄3 of the way down (grasp area)~~

~~B-P: Palm side of hand from 1⁄3 of the way down (grasp area) to the wrist crease~~

~~C-P: Palm side of hand from the wrist crease to the end of the glove~~

~~D-P: Palm side of thumb~~

~~E-P: Palm side of tip of thumb~~

~~F-P: Palm side of index finger~~

~~G-P: Palm side of fingertip of index finger~~

~~H-P: Palm side of nonindex fingers~~

~~I-P: Palm side of fingertip of nonindex fingers~~

~~A-PS: Sides of hand adjacent to section A-P~~

~~B-PS: Outside of hand adjacent to section B-P~~

~~C-PS: Sides of hand adjacent to section C-P~~

~~D-PS: Outside of thumb adjacent to section D-P~~

~~E-PS: Inside of thumb adjacent to section D-P~~

~~F-PS: Outside of index finger adjacent to section F-P~~

~~H-PS: In between fingers adjacent to sections F-P and H-P~~

~~I-PS: Outside of and adjacent to the smallest finger~~

~~A-B: Back side of hand from finger crotch line to 1⁄3 of the way down (knuckle area)~~

~~B-B: Back side of hand from 1⁄3 of the way down (knuckle area) to the wrist crease~~

~~C-B: Back side of hand from the wrist crease to the end of the glove~~

~~D-B: Back side of thumb~~

~~E-B: Back side of tip of thumb~~

~~F-B: Back side of index finger~~

~~G-B: Back side of fingertip of index finger~~

~~H-B: Back side of nonindex fingers~~

~~I-B: Back side of fingertip of nonindex fingers~~

~~A-BS: Sides of hand adjacent to section A-B~~

~~B-BS: Outside of hand adjacent to section B-B~~

~~C-BS: Sides of hand adjacent to section C-B~~

~~D-BS: Outside of thumb adjacent to section D-B~~

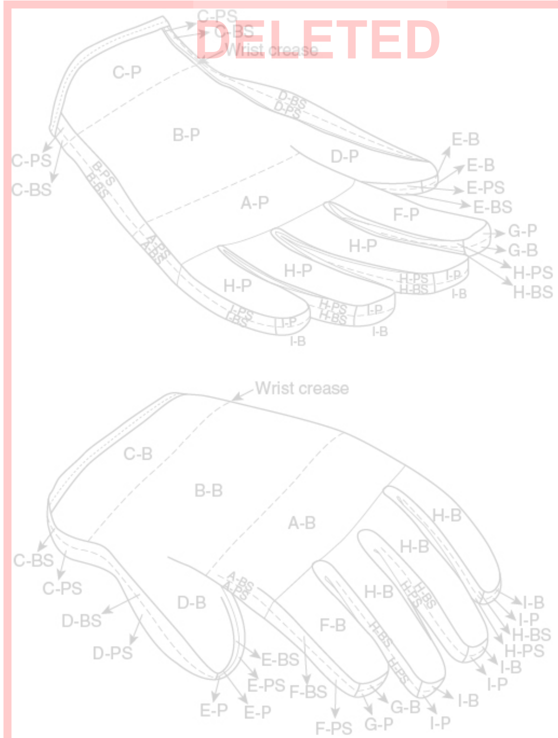
~~E-BS: Inside of thumb adjacent to section D-B~~

~~F-BS: Outside of index finger adjacent to section F-B~~

~~H-BS: In between fingers adjacent to sections F-B and H-B~~

~~I-BS: Outside of and adjacent to the smallest finger~~

~~Figure 13.1.8.1 Work Glove Test Areas.~~



~~**13.1.9** Cold Temperature Conditioning for Medical Facemasks and Eye and Face Protection Devices.~~

~~Specimens shall be exposed to cold in an environmental chamber at a temperature of 0°C ± 2°C, for a period of not less than 4 hours.~~

~~**13.2** Liquidtight Integrity Test One.~~

~~**13.2.1** Application.~~

~~**13.2.1.1**~~

~~This test method shall apply to garments and ensembles.~~

~~**13.2.1.2**~~

~~Modifications to this test method for testing single-use garments or single-use ensembles shall be as specified in 13.2.8 .~~

~~**13.2.1.3**~~

~~Modifications to this test method for testing multiple-use garments or multiple-use ensembles shall be as specified in 13.2.9 .~~

~~**13.2.2** Specimens.~~

~~**13.2.2.1**~~

~~A minimum of one specimen shall be tested. The specimen shall consist of the entire garment with all layers assembled that are required for the garment to be compliant.~~

~~**13.2.2.2**~~

~~The size of the garment comprising the specimen shall be chosen to conform with the dimensions of the manikin to ensure proper fit of the specimen on the manikin in accordance with the manufacturer's sizing system. The size of the garments comprising the specimen shall be the same size as the manikin in terms of chest circumference, waist circumference, and inseam height.~~

~~**13.2.2.3**~~

~~When ensembles are tested, specimens shall include all items that are specified as part of the ensemble in 11.7.1 or 11.8.1 .~~

~~**13.2.3** Sample Preparation.~~

~~**13.2.3.1**~~

~~Samples for conditioning shall be complete garments or ensembles.~~

~~**13.2.4** Apparatus.~~

~~The apparatus and supplies for testing shall be those specified in ASTM F1359, *Standard Test Method for Liquid Penetration Resistance of Protective Clothing or Protective Ensembles Under a Shower Spray While on a Manikin* , using the modifications in 13.2.4.1 and 13.2.4.2 .~~

~~**13.2.4.1***~~

~~The surface tension of the water used in testing shall be 35 dynes/cm ± 5 dynes/cm.~~

~~**A.13.2.4.1**~~

~~A 0.04-weight-percent solution of Surfynol 104H, or equivalent, with water gives a surface tension of 40 dynes/cm.~~

~~**13.2.4.2**~~

~~In the testing of garments, the manikin shall be positioned so that the manikin body is in a full vertical orientation with the manikin's head looking forward, manikin legs straight, and manikin arms pointing downward by the sides of the manikin torso. The manikin joints shall be tightened to ensure that the manikin maintains this position during testing.~~

~~**13.2.4.3**~~

~~In the testing of ensembles, the manikin shall be positioned so that the manikin body with the exception of the left arm is in a full vertical position with the manikin's head looking forward, manikin legs straight, and right manikin arm pointing down by the right side of the manikin torso. The left arm forearm shall be, bent upward at a 135-degree angle at the elbow from the manikin's side.~~

~~**13.2.5** Procedure.~~

~~Liquidtight integrity testing of garments shall be conducted in accordance with ASTM F1359, *Standard Test Method for Liquid Penetration Resistance of Protective Clothing or Protective Ensembles Under a Shower Spray While on a Manikin,* with the modifications in 13.2.5.1 through 23.2.5.6.~~

~~**13.2.5.1**~~

~~No provision for garments with a partial barrier layer shall be allowed.~~

~~**13.2.5.2***~~

~~The method used for mounting of the manikin in the spray chamber shall not interfere with the water spray.~~

~~**A.13.2.5.2**~~

~~Holding the manikin's feet down on a heavy, flat metal plate with two upright threaded posts, a large slotted metal bar, and heavy-duty metal bolts is the preferred means for mounting the manikin in the spray chamber to prevent any effects of the manikin mounting on the garment specimen.~~

~~**13.2.5.3**~~

~~Where non-full body garments are tested, those portions of the body not covered by the garment shall be blocked off and shall not be evaluated for watertight integrity.~~

~~**13.2.5.4**~~

~~Procedure A shall be used.~~

~~**13.2.6*** Report.~~

~~A diagram shall be prepared for each test that identifies the locations of any liquid leakage as detected on the liquid-absorptive garment.~~

~~**A.13.2.6**~~

~~The authority having jurisdiction can request a diagnosis of the mechanism of failure.~~

~~**13.2.7** Interpretation.~~

~~Any evidence of liquid on the liquid-absorptive garment, as determined by visual inspection, tactile inspection, or absorbent toweling, shall constitute failure of the specimen.~~

~~**13.2.8** Specific Requirements for Testing Single-Use Garments or Single-Use Ensembles.~~

~~**13.2.8.1**~~

~~Single-use garments and ensemble samples shall be conditioned as specified in 13.1.2 .~~

~~**13.2.8.2**~~

~~Single-use garment and ensemble specimens shall be exposed to the liquid spray for a total of 2 minutes with 30 seconds in each of the four specified manikin orientations.~~

~~**13.2.9** Specific Requirements for Testing Multiple-Use Garments or Multiple-Use Ensembles.~~

~~**13.2.9.1**~~

~~Multiple-use garments and the garment elements of the ensemble samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 . All other ensemble elements that are not attached to the garment element shall be conditioned as specified in 13.1.2 .~~

~~**13.2.9.2**~~

~~Multiple-use garment and ensemble specimens shall be exposed to the liquid spray for a total of 8 minutes with 2 minutes in each of the four specified manikin orientations.~~

~~**13.3** Biopenetration Test One.~~

~~**13.3.1** Application.~~

~~**13.3.1.1**~~

~~This test shall be applied to the barrier layer material and barrier layer seams used in the construction of garments, work gloves, face protection devices, footwear, and footwear covers.~~

~~**13.3.1.2**~~

~~Modifications to this test method for testing garments shall be as specified in 13.3.7 .~~

~~**13.3.1.3**~~

~~Modifications to this test method for testing work gloves shall be as specified in 13.3.11 .~~

~~**13.3.1.4**~~

~~Modifications to this test method for testing face protection devices shall be as specified in 13.3.8 .~~

~~**13.3.1.5**~~

~~Modifications to this test method for testing footwear shall be as specified in 13.3.9 .~~

~~**13.3.1.6**~~

~~Modifications to this test method for testing footwear covers shall be as specified in 13.3.10 .~~

~~**13.3.2** Specimens.~~

~~**13.3.2.1**~~

~~A minimum of three specimens shall be tested.~~

~~**13.3.2.2**~~

~~Each specimen shall consist of three 75 mm (3 in.) squares for each material type.~~

~~**13.3.2.3**~~

~~Specimens to be tested shall be representative materials and seams used in the actual construction, or representative of actual construction.~~

~~**13.3.3** Sample Preparation.~~

~~**13.3.3.1**~~

~~Samples of single-use garments, footwear materials, and footwear cover materials shall be conditioned as specified in 13.1.2 .~~

~~**13.3.3.2**~~

~~Samples of multiple-use garment barrier layers and garment barrier layer seams shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 .~~

~~**13.3.3.3**~~

~~Samples of single- and multiple-use face protection devices shall be conditioned as specified in 13.1.2 .~~

~~**13.3.4** Procedure.~~

~~Liquid penetration resistance testing shall be conducted in accordance with ASTM F1671/F1671M, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration as a Test System* .~~

~~**13.3.5** Report.~~

~~The pass/fail result for each specimen shall be recorded and reported.~~

~~**13.3.6** Interpretation.~~

~~A failure of any specimen constitutes failure of the material.~~

~~**13.3.7** Specific Requirements for Testing Garments.~~

~~Specimens for biopenetration testing shall consist of the barrier layer and barrier layer seams only. Elastomeric interface material shall be included when joined with the barrier layer.~~

~~**13.3.8** Specific Requirements for Testing Face Protection Devices.~~

~~**13.3.8.1**~~

~~Samples for conditioning shall be whole face protection devices.~~

~~**13.3.8.2**~~

~~Specimens to be tested shall consist of the barrier layer and barrier layer seams.~~

~~**13.3.9** Specific Requirements for Testing Footwear Materials.~~

~~**13.3.9.1**~~

~~Samples for conditioning shall be complete footwear or footwear composite swatches. Footwear composite swatches shall be representative of the footwear construction.~~

~~**13.3.9.2**~~

~~Specimens to be tested shall consist of the barrier layer and barrier layer seams.~~

~~**13.3.10** Specific Requirements for Testing Footwear Covers.~~

~~**13.3.10.1**~~

~~Samples for conditioning shall be whole footwear covers.~~

~~**13.3.10.2**~~

~~Specimens shall be taken from the footwear cover that are representative of the footwear cover construction.~~

~~**13.3.10.3**~~

~~Where more than one material is used in the construction of the footwear cover, each material shall be tested separately.~~

~~**13.3.11** Specific Requirements for Testing Work Glove Materials.~~

~~**13.3.11.1**~~

~~Work gloves that include separable inner gloves that are either single-use emergency medical examination gloves or single-use emergency medical cleaning/utility gloves shall not be evaluated for this requirement.~~

~~**13.3.11.2**~~

~~If the work glove contains a separable liner, the liner shall be combined with the work glove for purposes of conditioning as specified in 13.3.11.4 .~~

~~**13.3.11.3**~~

~~Specimens shall be representative of the glove moisture barrier and moisture barrier seams. Three specimens shall be tested.~~

~~**13.3.11.4**~~

~~Samples for conditioning shall be in the form of an 200 mm × 200 mm (8 in. × 8 in.) pouch. A smaller pouch size shall be permitted provided that the resulting test specimens are of sufficient size for the test. The pouch shall be made of two glove composite swatches. The two glove composites shall be permitted to be of the same materials and construction. The two glove body composites shall be permitted to be representative of either the palm or the back of the glove. The two glove composite swatches shall be constructed to simulate the actual layers of the glove, arranged in proper order. Where the moisture barrier material seam is being tested, the moisture barrier layer shall contain a seam. The seam shall run within 25 mm (1 in.) of the center and shall extend across the entire width of the specimen. Each of the two composite swatches shall be stitched on all four sides using the same thread as used in the glove construction. The two composite swatches shall then be sewn together, inner liner to inner liner, on three sides using the same thread as used in the glove construction.~~

~~**13.3.11.5**~~

~~Samples shall be conditioned as specified in 13.1.3 . If the glove liner for an examination glove is issued for single use only, it shall be conditioned as specified in 13.1.2 .~~

~~**13.3.11.6**~~

~~The glove moisture barrier layers shall be removed from the multilayer composite samples after all preconditioning has been completed and shall become the glove barrier test specimen.~~

~~**13.3.11.7**~~

~~Specimens for testing shall be the barrier layer only.~~

~~**13.3.11.8**~~

~~Where the moisture barrier material is continuous through the glove body, only the barrier seams shall be tested. The test cell shall include both the moisture barrier material and the moisture barrier seam. The seam shall be located in the approximate center of the test cell.~~

~~**13.4** Tensile Strength Test.~~

~~**13.4.1** Application.~~

~~13.4.1.1~~

~~This test shall apply to materials used in the construction of garments and upper materials for footwear covers. Where the garment or footwear cover is constructed of several separable layers, each separable layer of garment material or footwear upper material shall be tested.~~

~~13.4.2~~ ~~Specimens.~~

~~Five specimens in each of the warp and fill directions shall be tested from each sample unit.~~

~~13.4.3~~ ~~Sample Preparation.~~

~~13.4.3.1~~

~~Samples for conditioning shall be at least 1 m~~ ^{2} ~~(1 yd~~ ^{2} ~~) of the garment material or whole footwear cover.~~

~~13.4.3.2~~

~~Single-use garment and footwear cover samples shall be conditioned as specified in 13.1.2 .~~

~~13.4.3.3~~

~~Multiple-use garment samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 .~~

~~13.4.4~~ ~~Procedure.~~

~~Specimens shall be tested in accordance with ASTM D5034,~~ *~~Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)~~* ~~.~~

~~13.4.5~~ ~~Report.~~

~~13.4.5.1~~

~~The tensile strength of each specimen shall be recorded and reported to the nearest 0.5 N (0.1 lbf) of force.~~

~~13.4.5.2~~

~~An average tensile strength shall be calculated and reported for warp and fill directions.~~

~~13.4.6~~ ~~Interpretation.~~

~~13.4.6.1~~

~~Pass/fail performance shall be based on the average tensile strength in the warp and fill directions.~~

~~13.4.6.2~~

~~A failure in any one direction shall constitute failure for the material.~~

~~13.5~~ ~~Burst Strength Test.~~

~~13.5.1~~ ~~Application.~~

~~13.5.1.1~~

~~This test shall apply to materials used in the construction of garments. Where the garment is constructed of several separable layers, each separable layer of garment material shall be tested.~~

~~13.5.1.2~~

~~Modifications to this test method for testing garment or hood visors shall be as specified in 13.5.7 .~~

~~13.5.2~~ ~~Specimens.~~

~~A total of 10 specimens shall be tested.~~

~~13.5.3~~ ~~Sample Preparation.~~

~~**13.5.3.1**~~

~~Samples for conditioning shall be at least 1 m~~ $\cancel{^2}$ ~~(1 yd~~ $\cancel{^2}$ ~~) of material.~~

~~**13.5.3.2**~~

~~Single-use garment samples shall be conditioned as specified in 13.1.2 .~~

~~**13.5.3.3**~~

~~Multiple-use garment samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 .~~

~~**13.5.4** Procedure.~~

~~Specimens shall be tested in accordance with ASTM D3787,~~ ~~*Method for Bursting Strength of Textiles — Constant-Rate-of-Traverse (CRT) Ball Burst Test*~~ ~~.~~

~~**13.5.5** Report.~~

~~The burst strength of each specimen shall be recorded and reported to the nearest 0.5 N (0.1 lbf). The average burst strength of all specimens shall be calculated and reported.~~

~~**13.5.6** Interpretation.~~

~~The average burst strength shall be used to determine pass/fail performance.~~

~~**13.5.7** Specific Requirements for Testing Garment or Hood Visor Materials.~~

~~Visor materials that have a thickness greater than 0.25 mm (0.010 in.) when measured in accordance with ASTM D6988,~~ ~~*Standard Guide for Determination of Thickness of Plastic Film Test Specimens,*~~ ~~shall not be tested.~~

~~**13.6** Puncture Propagation Tear Resistance Test.~~

~~**13.6.1** Application.~~

~~**13.6.1.1**~~

~~This test shall apply to materials used in the construction of multiple-use garments. Where the garment is constructed of several separable layers, each separable layer of garment material shall be tested.~~

~~**13.6.1.2**~~

~~Modifications to this test method for testing garment or hood visors shall be as specified in 13.5.7 .~~

~~**13.6.2** Specimens.~~

~~Five specimens in each of the warp and fill directions shall be tested from each sample unit.~~

~~**13.6.3** Sample Preparation.~~

~~**13.6.3.1**~~

~~Samples for conditioning shall be at least 1 m~~ $\cancel{^2}$ ~~(1 yd~~ $\cancel{^2}$ ~~) of material.~~

~~**13.6.3.2**~~

~~Samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 .~~

~~**13.6.4** Procedure.~~

~~Specimens shall be tested in accordance with ASTM D2582,~~ ~~*Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting*~~ ~~.~~

~~**13.6.5** Report.~~

~~**13.6.5.1**~~

~~The puncture propagation tear resistance of each specimen shall be recorded and reported to the nearest 0.5 N (0.1 lbf) of force.~~

~~**13.6.5.2**~~

~~An average puncture propagation tear resistance shall be calculated and reported for warp and fill directions.~~

~~**13.6.6** Interpretation.~~

~~**13.6.6.1**~~

~~Pass/fail performance shall be based on the average puncture propagation tear resistance in the warp and fill directions.~~

~~**13.6.6.2**~~

~~Failure in any one direction shall constitute failure for the material.~~

~~**13.6.7** Specific Requirements for Testing Garment or Hood Visor Materials.~~

~~Visor materials that have a thickness greater than 0.25 mm (0.010 in.) when measured in accordance with ASTM D6988, *Standard Guide for Determination of Thickness of Plastic Film Test Specimens,* shall not be tested.~~

~~**13.7** Tear Resistance Test One.~~

~~**13.7.1** Application.~~

~~This test shall apply to materials used in the construction of multiple-use garments. Where the garment is constructed of several separable layers, each separable layer of garment material shall be tested.~~

~~**13.7.2** Specimens.~~

~~**13.7.2.1**~~

~~Five specimens in each of the warp and fill directions shall be tested for each material.~~

~~**13.7.2.2**~~

~~Specimens shall be prepared in accordance with ASTM D5587, *Standard Test Method for Tearing of Fabrics by Trapezoid Procedure* .~~

~~**13.7.3** Sample Preparation.~~

~~**13.7.3.1**~~

~~Samples for conditioning shall be at least 1 m^2 (1 yd^2) of material.~~

~~**13.7.3.2**~~

~~Garment samples shall be conditioned as specified in 8.1.3 and then conditioned as specified in 13.1.2 .~~

~~**13.7.4** Procedure.~~

~~Specimens shall be tested in accordance with ASTM D5587, *Standard Test Method for Tearing of Fabrics by Trapezoid Procedure* .~~

~~**13.7.5** Report.~~

~~**13.7.5.1**~~

~~The tear strength of an individual specimen shall be the average of the five highest peak loads of resistance registered for mm (in.) of separation of the tear.~~

~~**13.7.5.2**~~

~~The tear strength of each specimen shall be recorded and reported to the nearest 0.5 N (0.1 lbf) of force.~~

~~**13.7.5.3**~~

~~An average tear strength shall be calculated and reported for warp and fill directions.~~

~~**13.7.6** Interpretation.~~

~~**13.7.6.1**~~

~~Pass/fail performance shall be based on the average tear strength in the warp and fill directions.~~

~~**13.7.6.2**~~

~~Failure in any one direction shall constitute failure for the material.~~

~~**13.8** Seam Breaking Strength Test.~~

~~**13.8.1** Application.~~

~~**13.8.1.1**~~

~~This test shall be applied to seams used in the construction of garments.~~

~~**13.8.1.2**~~

~~Where garments consist of multiple separable layers, the test shall be applied to the seams of each separable layer.~~

~~**13.8.2** Specimens.~~

~~**13.8.2.1**~~

~~A minimum of five seam specimens representative of the garment shall be tested for each seam type.~~

~~**13.8.2.2**~~

~~Straight-seam specimens shall be cut from conditioned samples.~~

~~**13.8.2.3**~~

~~Specimens for testing shall include at least 100 mm (4 in.) of material on either side of the seam.~~

~~**13.8.3** Sample Preparation.~~

~~**13.8.3.1**~~

~~Samples for conditioning shall be at least 1 m~~ $\cancel{^2}$ ~~(1 yd~~ $\cancel{^2}$ ~~) of material.~~

~~**13.8.3.2**~~

~~Single-use garment samples shall be conditioned as specified in 13.1.2 .~~

~~**13.8.3.3**~~

~~Multiple-use garment samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 .~~

~~**13.8.4** Procedure.~~

~~All seams shall be tested in accordance with ASTM D1683/D1683M,~~ ~~*Standard Test Method for Failure in Sewn Seams of Woven Fabrics.*~~

~~**13.8.5** Report.~~

~~**13.8.5.1**~~

~~The breaking strength for each seam specimen shall be recorded and reported to the nearest 0.5 N (0.1 lbf) of force.~~

~~**13.8.5.2**~~

~~The average breaking strength for each seam type shall also be recorded and reported.~~

~~**13.8.6** Interpretation.~~

~~The average breaking strength for each seam or closure assembly type shall be used to determine pass/fail performance.~~

~~**13.9** Liquidtight Integrity Test Two.~~

~~**13.9.1** Application.~~

~~**13.9.1.1**~~

~~This test shall be applied to whole examination gloves and cleaning/utility gloves.~~

~~**13.9.1.2**~~

~~Modifications to this test method for testing examination gloves shall be as specified in 13.9.7 .~~

~~**13.9.1.3**~~

~~Modifications to this test method for testing cleaning/utility gloves shall be as specified in 13.9.8 .~~

~~**13.9.2** Specimens.~~

~~Specimens shall be whole examination gloves or cleaning/utility gloves.~~

~~**13.9.3** Sample Preparation.~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.9.4*** Procedure.~~

~~Liquidtight integrity testing shall be conducted in accordance with ASTM D5151, *Standard Test Method for Detection of Holes in Medical Gloves* , with the modification that the water shall be replaced with water treated with a surfactant to achieve a surface tension of 35 dynes/cm ± 2 dynes/cm.~~

~~**A.13.9.4**~~

~~A 0.04-weight-percent solution of Surfynol 104H with water gives a surface tension of 40 dynes/cm.~~

~~**13.9.5** Report.~~

~~The pass or fail result for each specimen shall be recorded and reported.~~

~~**13.9.6** Interpretation.~~

~~Passing performance shall be based on the number of passing and failing specimens.~~

~~**13.9.7** Specific Requirements for Testing Examination Gloves.~~

~~**13.9.7.1**~~

~~The number of specimens shall be determined in accordance with ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection* .~~

~~**13.9.7.2**~~

~~A minimum of 32 specimens shall be tested.~~

~~**13.9.7.3**~~

~~Passing performance shall be consistent with a set of specimens that meets an acceptable quality level of 1.5 or better, in accordance with ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*~~

~~**13.9.8** Specific Requirements for Testing Cleaning/Utility Gloves.~~

~~**13.9.8.1**~~

~~A total of 10 different specimens shall be tested.~~

~~**13.9.8.2**~~

~~The cleaning/utility glove shall be filled with the surfactant-treated water to a height 25 mm (1 in.) above the top of the thumb crotch, when the glove is oriented in the fingers down position.~~

~~**13.9.8.3**~~

~~If one of the 10 specimens fails, a second set of 10 specimens shall be tested and the results of the second specimen set used to determine pass/fail performance.~~

~~**13.10** Biopenetration Test Two.~~

~~**13.10.1** Application.~~

~~This test shall be applied to whole gloves.~~

~~**13.10.2** Specimens.~~

~~A minimum of five whole glove specimens shall be tested.~~

~~**13.10.3** Sample Preparation.~~

~~**13.10.3.1**~~

~~Samples for conditioning shall be whole gloves.~~

~~**13.10.3.2**~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.10.4** Procedure.~~

~~**13.10.4.1**~~

~~Liquid penetration resistance testing shall be conducted in accordance with ASTM F1671/F1671M, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration as a Test System* .~~

~~**13.10.4.2**~~

~~The modifications specified in 13.10.4.2.1 through 13.10.4.2.7 shall apply.~~

~~**13.10.4.2.1**~~

~~The test shall be performed by placing a sufficient volume of sterile nutrient broth into a 1000 ml (34 fl oz) Erlenmeyer flask or other suitably sized vessel.~~

~~**13.10.4.2.2**~~

~~The specimen shall be inverted such that the inside of the glove is facing outward and carefully immersed into the sterile nutrient broth such that the height of the broth is 25 mm + 5 mm (1 in. + $\frac{3}{16}$ in.) above the specimen glove thumb crotch. The excess top of the specimen shall be stretched over the mouth of the flask.~~

~~**13.10.4.2.3**~~

~~The specimen shall be filled with a sufficient volume of Phi-X174 bacteriophage suspension such that the height of the suspension is approximately 25 mm ± 2.5 mm (1 in. ± $\frac{3}{32}$ in.) higher than the outside level of the sterile nutrient broth.~~

~~**13.10.4.2.4**~~

~~Five ml (0.2 fl oz) of sterile nutrient broth shall be removed from the flask and assayed to confirm that there was no contamination.~~

~~**13.10.4.2.5**~~

~~The specimen cuff shall be sealed onto the flask using parafilm or tape. A sterile closure shall be placed on the top of the flask.~~

~~**13.10.4.2.6**~~

~~The flask shall be placed onto the platform of an orbital shaker and shaken at a speed of 100 rpm +10 min/−0 rpm for a period of 1 hour +5 minutes/−0 minutes.~~

~~**13.10.4.2.7**~~

~~At the end of 1 hour +5 minutes/−0 minutes, the flask shall be removed from the orbital shaker, the glove shall be removed from the flask, and the contents of the flask shall be carefully transferred to a sterile bottle and assayed for the presence of Phi-X174 bacteriophage.~~

~~**13.10.5** Report.~~

~~The pass/fail result for each specimen shall be recorded and reported.~~

~~**13.10.6** Interpretation.~~

~~A failure of any specimen constitutes failure of the material.~~

~~**13.11** Ultimate Tensile Strength Test.~~

~~**13.11.1** Application.~~

~~**13.11.1.1**~~

~~This test shall be applied to glove and elastomeric interface materials.~~

~~**13.11.1.2**~~

~~Modifications to this test method for testing elastomeric interface materials shall be as specified in 13.11.7 .~~

~~**13.11.2** Specimens.~~

~~**13.11.2.1**~~

~~A minimum of 10 specimens shall be tested.~~

~~**13.11.2.2**~~

~~Specimens shall be taken from the palm and back of individual gloves.~~

~~**13.11.3** Sample Preparation.~~

~~**13.11.3.1**~~

~~Samples for conditioning shall be cut from whole gloves.~~

~~**13.11.3.2**~~

~~Specimens shall be tested for ultimate tensile strength after conditioning as specified in 13.1.2 .~~

~~**13.11.3.3**~~

~~Specimens shall be tested for ultimate tensile strength after conditioning as specified in 13.1.5 .~~

~~**13.11.4** Procedure.~~

~~Specimens shall be tested in accordance with Method A — Dumbbell Specimens, of ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers — Tension.* Specimens shall be cut using Die C (metric).~~

~~**13.11.4.1**~~

~~The specimen elongation at break shall be measured.~~

~~**13.11.5** Report.~~

~~**13.11.5.1**~~

~~The ultimate tensile strength before and after heat aging shall be recorded and reported for each specimen to the nearest 10 kPa (2 psi).~~

~~**13.11.5.2**~~

~~The average ultimate tensile strength before and after heat aging shall be calculated and reported for all specimens tested.~~

~~**13.11.5.3**~~

~~The elongation of the specimens at break shall be reported before heat aging with the average elongation at break calculated and reported.~~

~~**13.11.6** Interpretation.~~

~~**13.11.6.1**~~

~~The average ultimate tensile strength both before and after heat aging shall be individually used to determine pass/fail performance.~~

~~**13.11.6.2**~~

~~The average elongation at break before heat aging shall be used to determine pass/fail performance.~~

~~**13.11.7** Specific Requirements for Testing Elastomeric Interface Materials.~~

~~**13.11.7.1**~~

~~Samples for conditioning shall be either elastomeric interface sheet material of a size that is sufficiently large to provide the required number of specimens or formed elastomeric interface material components such as hood gaskets.~~

~~**13.11.7.2**~~

~~Specimens shall be taken from elastomeric interface sheet material or formed elastomeric interface material components that are representative of the component material nominal thickness.~~

~~**13.12** Ultimate Elongation Test.~~

~~**13.12.1** Application.~~

~~This test shall be applied to glove materials.~~

~~**13.12.2** Specimens.~~

~~**13.12.2.1**~~

~~A minimum of 10 specimens shall be tested.~~

~~**13.12.2.2**~~

~~Specimens shall be taken from the palm and back of individual gloves.~~

~~**13.12.3** Sample Preparation.~~

~~**13.12.3.1**~~

~~Samples for conditioning shall be cut from whole gloves.~~

~~**13.12.3.2**~~

~~Specimens shall be tested after conditioning as specified in 13.1.4 .~~

~~**13.12.3.3**~~

~~Specimens shall be tested after conditioning as specified in 13.1.5 .~~

~~**13.12.4** Procedure.~~

~~Specimens shall be tested in accordance with Method A — Dumbbell Specimens, of ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers — Tension* .~~

~~**13.12.5** Report.~~

~~**13.12.5.1**~~

~~The ultimate elongation (percentage) shall be recorded and reported for each specimen to the nearest 10 percent.~~

~~**13.12.5.2**~~

~~The average ultimate elongation (percentage) shall be recorded and reported for all specimens tested.~~

~~**13.12.6** Interpretation.~~

~~The average ultimate elongation after heat aging and the average ultimate elongation after isopropanol immersion shall be used to determine pass/fail performance.~~

~~**13.13** Puncture Resistance Test One.~~

~~**13.13.1** Application.~~

~~**13.13.1.1**~~

~~This test shall be applied to examination, cleaning, and work glove materials, footwear upper materials, footwear cover materials, and elastomeric interface materials.~~

~~**13.13.1.2**~~

~~Modifications to this test method for testing examination, cleaning, and work glove materials shall be as specified in 13.13.7 and 13.13.8 .~~

~~**13.13.1.3**~~

~~Modifications to this test method for testing footwear upper material shall be as specified in 13.13.9 .~~

~~**13.13.1.4**~~

~~Modifications to this test method for testing footwear cover materials shall be as specified in 13.13.10 .~~

~~**13.13.1.5**~~

~~Modifications to this test method for testing elastomeric interface materials shall be as specified in 13.13.11 .~~

~~**13.13.2** Specimens.~~

~~A minimum of three specimens measuring at least 150 mm~~ ^{2} ~~(6 in.~~ ^{2} ~~) shall be tested.~~

~~**13.13.3** Sample Preparation.~~

~~**13.13.3.1**~~

~~Samples for conditioning shall be complete whole gloves, whole footwear, and whole footwear covers.~~

~~**13.13.3.2**~~

~~Specimens shall be tested after conditioning as specified in 13.1.2 .~~

~~**13.13.4** Procedure.~~

~~**13.13.4.1**~~

~~Specimens shall be tested in accordance with ASTM F1342/F1342M, *Standard Test Method for Protective Clothing Material Resistance to Puncture* , using Test Method A, with the following modification:~~

> ~~The compression load cell shall be capable of discerning 0.5 N (0.1 lbf) of force in the range suitable for the glove material being tested. The upper limit of the load cell shall not be more than 10 times the actual puncture resistance measured for the glove specimens.~~

~~**13.13.5** Report.~~

~~**13.13.5.1**~~

~~The puncture force shall be recorded and reported for each specimen to the nearest 0.5 N (0.1 lbf) of force.~~

~~**13.13.5.2**~~

~~The average puncture force shall be calculated and reported for all specimens tested.~~

~~**13.13.6** Interpretation.~~

~~The average puncture force shall be used to determine pass/fail performance.~~

~~**13.13.7** Specific Requirements for Testing Examination and Cleaning Glove Materials.~~

~~**13.13.7.1**~~

~~Specimens shall consist of each composite of the palm, palm side of the fingers, and back of the glove with layers arranged in the proper order.~~

~~**13.13.7.2**~~

~~Where the specimens of the palm, palm side of the fingers, and back of the glove are identical, only one representative composite shall be required to be tested.~~

~~**13.13.8** Specific Requirements for Testing Work Glove Materials.~~

~~**13.13.8.1**~~

~~Specimens shall be representative of the glove body composite construction at the following glove areas as described in 13.1.8 : A-P, B-P, D-P, E-P, F-P, G-P, H-P, and I-P. Where the specimen composites of the palm and palm side of the fingers are identical, only one representative composite shall be required to be tested. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:~~

- ~~Ridged areas or similar where stitching is used to create specific performance characteristics rather than for glove assembly~~
- ~~When there are size constraints of a material making it necessary to allow stitching in order to create the sample size required~~

~~**13.13.8.2**~~

~~Stitching shall be of the same type as is used in the actual glove construction.~~

~~**13.13.9** Specific Requirements for Testing Footwear Upper Materials.~~

~~Specimens shall consist of each composite of the footwear item used in the actual footwear construction, excluding the tongue and gusset, with layers arranged in proper order. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be tested. Specimens shall not include seams.~~

~~**13.13.10** Specific Requirements for Testing Footwear Cover Materials.~~

~~Specimens shall be taken from the footwear wear surface and shall include all layers used in the construction of the footwear cover from wear surface exterior to interior of the footwear cover.~~

~~**13.13.10.1**~~

~~Specimens shall be taken from the footwear cover that are representative of the footwear cover construction.~~

~~**13.13.10.2**~~

~~Where more than one material is used in the construction of the footwear cover, then each material shall be tested separately.~~

~~**13.13.11** Specific Requirements for Testing Elastomeric Interface Materials.~~

~~**13.13.11.1**~~

~~Samples for conditioning shall be either elastomeric interface sheet material of a size that is sufficiently large to provide the required number of specimens or formed elastomeric interface material components such as hood gaskets.~~

~~**13.13.11.2**~~

~~Specimens shall be taken from elastomeric interface sheet material or formed elastomeric interface material components that are representative of the gasket material's nominal thickness.~~

~~**13.14** Dexterity Test One.~~

~~**13.14.1** Application.~~

~~This test shall be applied to examination gloves.~~

~~**13.14.2** Specimens.~~

~~**13.14.2.1**~~

~~A minimum of three glove pairs each for size small and for size large shall be used for testing.~~

~~**13.14.2.2**~~

~~Each glove pair shall be tested as a complete set of gloves in new, as-distributed condition.~~

~~**13.14.3** Sample Preparation.~~

~~**13.14.3.1**~~

~~Samples for conditioning shall be whole glove pairs.~~

~~**13.14.3.2**~~

~~Glove pair specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.14.3.3**~~

~~Glove pair specimens shall not receive special softening treatments prior to tests.~~

~~**13.14.4** Procedure.~~

~~**13.14.4.1**~~

~~Dexterity shall be evaluated using the standardized procedure known as the Crawford Small Parts Dexterity Test, Screws Technique.~~

~~**13.14.4.2**~~

~~Two test subjects, one for hand size small and one for hand size large, shall be selected such that their hand dimensions are consistent with those specified in 11.2.1 for emergency medical examination gloves.~~

~~**13.14.4.3**~~

~~Each test subject used to perform the test shall practice until the baseline times of that person's last three repetitions vary no more than 6 percent.~~

~~**13.14.4.4**~~

~~Each test subject shall be tested with a minimum of three pairs of gloves. A minimum of six dexterity tests with gloves shall be conducted, with at least three dexterity tests with size small gloves and three dexterity tests with size large gloves. Each test subject shall repeat the test until the times of the last three repetitions vary no more than 6 percent.~~

~~**13.14.4.5**~~

~~Dexterity test times with gloves shall be compared with baseline dexterity test times for specific test subjects. The percentage of dexterity test times with gloves to baseline dexterity test times shall be calculated as follows:~~

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$$\text{Percent of bare-handed control} = \frac{\text{Dexterity test time with gloves}}{\text{Baseline dexterity test time}} \times 100$$

~~**[23.14.4.5]**~~

~~**13.14.5** Report.~~

~~The percent of barehanded control shall be recorded and reported for each glove pair specimen and test subject tested.~~

~~**13.14.6** Interpretation.~~

~~One or more glove pair specimens failing this test shall constitute failing performance.~~

~~**13.15** Protein Content Test.~~

~~**13.15.1** Application.~~

~~This test shall be applied to glove materials.~~

~~**13.15.2** Specimens.~~

~~**13.15.2.1**~~

~~Specimens, measuring at least 25 mm (1 in.) square, shall be taken from a minimum of three different gloves for each glove type.~~

~~**13.15.2.2**~~

~~A minimum of three specimens per glove shall be tested.~~

~~**13.15.3** Sample Preparation.~~

~~**13.15.3.1**~~

~~Samples for conditioning shall be whole gloves and shall be conditioned as specified in 13.1.2 .~~

~~**13.15.3.2**~~

~~Specimens shall be taken from conditioned samples.~~

~~**13.15.4** Procedure.~~

~~Specimens shall be tested in accordance with ASTM D5712, *Standard Test Method for Analysis of Aqueous Extractable Protein in Latex, Natural Rubber, and Elastomeric Products Using the Modified Lowry Method* .~~

~~**13.15.5** Report.~~

~~**13.15.5.1**~~

~~The protein level of each specimen shall be recorded and reported to the nearest 10 µg per gram of glove material.~~

~~**13.15.5.2**~~

~~The average protein level shall be calculated and reported for all specimens.~~

~~**13.15.6** Interpretation.~~

~~Pass/fail performance shall be based on the average reported protein level for each glove type.~~

~~**13.16** Visual Acuity/Fogging Resistance Test.~~

~~**13.16.1** Application.~~

~~This test method shall apply to the portion of medical facemasks and eye and face protection device that cover the wearer's eyes.~~

~~**13.16.2** Specimens.~~

~~**13.16.2.1**~~

~~A minimum of three specimens shall be tested.~~

~~**13.16.2.2**~~

~~Specimens shall be complete medical facemasks or eye and face protection devices.~~

~~**13.16.2.3**~~

~~Specimens shall be selected to fit each test subject in accordance with the manufacturer's sizing guidelines.~~

~~**13.16.3** Sample Preparation.~~

~~**13.16.3.1**~~

~~Samples for conditioning shall be complete medical facemasks or eye and face protection devices.~~

~~**13.16.3.2**~~

~~Samples shall be conditioned as specified in 23.1.10.~~

~~**13.16.4** Procedure.~~

~~**13.16.4.1**~~

~~Testing shall be conducted in an atmosphere with a temperature of 21°C ± 3°C, and a relative humidity of 50 percent ± 5 percent.~~

~~**13.16.4.2**~~

~~Testing shall be conducted using a minimum of three different test subjects.~~

~~**13.16.4.3**~~

~~The test subjects shall have a minimum visual acuity of 20/20 in each eye uncorrected, or corrected with contact lenses, as determined by a visual acuity test or doctor's examination.~~

~~**13.16.4.4**~~

~~Prior to evaluation for visual acuity, the medical facemask or eye and face protection device shall be inspected for functionality and the ability to be donned and adjusted in accordance with the manufacturer's instructions.~~

~~**13.16.4.5**~~

~~To evaluate visual acuity, the medical facemask or eye and face protection device shall be donned and adjusted in accordance with the manufacturer's instructions.~~

~~**13.16.4.6**~~

~~The test subject shall wear the medical facemask or eye and face protection device for a period of 3 minutes ± 30 seconds, before reading the eye chart. The 3-minute period shall commence when the facemask is fully donned and adjusted by the subject.~~

~~**13.16.4.7**~~

~~The test shall be conducted using a standard 6.1 m (20 ft) eye chart with a normal lighting range of 100 to 150 foot-candles at the chart and with test subjects positioned at a distance of 6.1 m (20 ft) from the chart.~~

~~**13.16.4.8**~~

~~Test subjects shall then read the standard eye chart through the medical facemask or eye and face protection device, and the visual acuity of each subject shall be determined.~~

~~**13.16.5** Report.~~

~~**13.16.5.1**~~

~~The visual acuity of each test subject through the medical facemask or eye and face protection device shall be recorded and reported.~~

~~**13.16.5.2**~~

~~The ability of the test subject to don and doff the medical facemask or eye and face protection device without difficulty or without damage to the medical facemask or eye and face protection device shall be noted.~~

~~**13.16.6** Interpretation.~~

~~**13.16.6.1**~~

~~Failure of any one test subject to achieve the required visual acuity while wearing the medical facemask or eye and face protection device shall constitute failure of the test.~~

~~**13.16.6.2**~~

~~If any medical facemask or eye and face protection device cannot be properly donned or doffed, or sustains any damage during the testing, the medical facemask or eye and face protection device shall be considered to have failed the test.~~

~~**13.17** Liquidtight Integrity Test Three.~~

~~**13.17.1** Application.~~

~~**13.17.1.1**~~

~~This test shall apply to medical facemasks and eye and face protection devices.~~

~~**13.17.1.2**~~

~~Modifications to this test method for evaluating medical facemasks shall be as specified in 13.17.8 .~~

~~**13.17.1.3**~~

~~Modifications to this test method for evaluating single-use eye and face protection devices shall be as specified in 13.17.9 .~~

~~**13.17.1.4**~~

~~Modifications to this test method for evaluating single-use eye and face protection devices shall be as specified in 13.17.10 .~~

~~**13.17.2** Specimens.~~

~~**13.17.2.1**~~

~~A minimum of three specimens shall be tested for each target area.~~

~~**13.17.2.2**~~

~~Specimens shall be complete medical facemasks or eye and face protection devices.~~

~~**13.17.3** Sample Preparation.~~

~~**13.17.3.1**~~

~~Samples for conditioning shall be complete medical facemasks or eye and face protection devices.~~

~~**13.17.3.2**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.17.4** Apparatus.~~

~~**13.17.4.1**~~

~~The test apparatus shall be as specified in ASTM F1862/F1862M, *Standard Test Method for Resistance of Medical Face Masks to Penetration by Synthetic Blood (Horizontal Projection of Fixed Volume at a Known Velocity)* .~~

~~**13.17.4.2**~~

~~Where needed to support the specimen, a headform shall be used.~~

~~**13.17.4.3**~~

~~The headform shall be permitted to be a human-shape headform, such as the Alderson headform shown in Figure 11.3.2.4 .~~

~~**13.17.5** Procedures.~~

~~Medical facemasks and eye and face protection devices shall be tested as specified in ASTM F1862/F1862M, *Standard Test Method for Resistance of Medical Face Masks to Penetration by Synthetic Blood (Horizontal Projection of Fixed Volume at a Known Velocity)* , with the modifications specified below:~~

~~The medical facemask or eye and face protection device shall be positioned on an appropriate holder or headform such that the distance from the tip of pneumatic valve cannula to the target area on the face protection device is 305 mm (12 in.) and the target area of the medical facemask or eye and face protection device is perpendicular to the path of the synthetic blood.~~

~~Testing shall be conducted at a blood velocity equivalent to a blood pressure of 21.3 kPa (160 mm Hg).~~

~~An absorptive blotting paper or similar absorptive material shall be permitted to be placed on the interior side of the medical facemask or eye and face protection device to provide an aid in determining the occurrence of synthetic blood strikethrough.~~

~~Pass/fail results shall be reported only. An acceptable quality limit shall not be applied in testing.~~

~~13.17.5.1~~

~~Straps, ear loops, and temple portions of face protection devices shall not be evaluated.~~

~~13.17.6~~ ~~Report.~~

~~The pass/fail result for each target for each face protection device evaluated shall be recorded and reported.~~

~~13.17.7~~ ~~Interpretation.~~

~~Failure of any one target area for any tested face protection device shall constitute failing performance for the face protection device.~~

~~13.17.8~~ ~~Specific Requirements for Testing Medical Facemasks.~~

~~13.17.8.1~~

~~Where medical facemasks do not incorporate visors or faceshields, target areas shall include locations 13 mm (1/2 in.) from each side of the medical facemask and 13 mm (1/2 in.) from the top and bottom of the medical facemask, centered on the horizontal height or span of the medical facemask, respectively.~~

~~13.17.8.2~~

~~Where medical facemasks do incorporate visors or faceshields, target areas shall include locations 13 mm (1/2 in.) from each side of the medical facemask, 13 mm (1/2 in.) from the bottom of the medical facemask, and 13 mm (1/2 in.) from the bottom center of the visor or faceshield centered on the horizontal height or span of the medical facemask, respectively.~~

~~13.17.8.3~~

~~Target areas shall not coincide with attachment points for ear loops or other attachment or hardware provided on the medical facemask.~~

~~13.17.9~~ ~~Specific Requirements for Testing Single-Use Eye and Face Protection Devices.~~

~~13.17.9.1~~

~~Specific target areas on each eye and face protection device to be evaluated shall include the portions of the eye and face protection device that directly cover the center of each of the wearer's eyes, two locations 13 mm (1/2 in.) from the edge of the protective area provided by the eye and face protection device, and at least one location at every representative seam or junction of the eye and face protection device.~~

~~13.17.9.2~~

~~Target areas shall not coincide with attachment points for ear loops or other attachment or hardware provided on the eye and face protection device.~~

~~**13.17.10** Specific Requirements for Testing Multiple-Use Eye and Face Protection Devices.~~

~~Specific target areas shall include at least one location at every representative juncture or interface between different items that are not continuous for the eye and face protection device.~~

~~**13.18** Cut Resistance Test.~~

~~**13.18.1** Application.~~

~~**13.18.1.1**~~

~~This test method shall apply to cleaning/utility gloves, work gloves, footwear upper materials, and elastomeric interface materials.~~

~~**13.18.1.2**~~

~~Modifications to this test method for evaluation of cleaning/utility gloves shall be as specified in 13.18.7 .~~

~~**13.18.1.3**~~

~~Modifications to this test method for evaluation of work gloves shall be as specified in 13.18.8 .~~

~~**13.18.1.4**~~

~~Modifications to this test method for evaluation of footwear upper materials shall be as specified in 13.18.9 .~~

~~**13.18.1.5**~~

~~Modifications to this test method for evaluation of elastomeric interface materials shall be as specified in 13.18.10 .~~

~~**13.18.2** Specimens.~~

~~A minimum of three specimens shall be tested.~~

~~**13.18.3** Sample Preparation.~~

~~**13.18.3.1**~~

~~Samples for conditioning shall be whole gloves or footwear uppers.~~

~~**13.18.3.2**~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.18.4** Procedure.~~

~~Specimens shall be evaluated in accordance with ASTM F1790, *Standard Test Method for Measuring Cut Resistance of Materials Used in Protective Clothing* , with the modification that specimens shall be tested to a specific load with the measurement of cut distance.~~

~~**13.18.5** Report.~~

~~**13.18.5.1**~~

~~The cut distance shall be recorded and reported to the nearest 1 mm ($^{1}/_{32}$ in.) for each specimen.~~

~~**13.18.5.2**~~

~~The average cut distance in mm (in.) shall be calculated and reported for all specimens tested.~~

~~**13.18.6** Interpretation.~~

~~The average cut distance shall be used to determine pass/fail performance.~~

~~**13.18.7** Specific Requirements for Testing Cleaning/Utility Gloves.~~

~~**13.18.7.1**~~

~~Specimens shall be taken from the back and palm of the glove and shall not include seams.~~

~~**13.18.7.2**~~

~~Cut resistance testing shall be performed under a load of 25 g (0.9 oz).~~

~~**13.18.8** Specific Requirements for Testing Work Gloves.~~

~~**13.18.8.1**~~

~~Specimens shall be representative of the glove body composite construction at the following glove areas as described in 13.1.8 and shall not include seams: A-P, B-P, D-P, E-P, F-P, G-P, H-P, I-P, A-B, B-B, D-B, E-B, F-B, G-B, H-B, and I-B. Specimens shall be representative of each glove body composite construction. All variations in composite construction and the order of layering of composite materials shall constitute a new composite and shall be tested separately. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be representative of the composite with reinforcement layer(s). Specimens shall not include seams except in the following cases:~~

~~Ridged areas or similar where stitching is used to create specific performance characteristics rather than for glove assembly~~

~~When there are size constraints of a material making it necessary to allow stitching in order to create the sample size required~~

~~**13.18.8.2**~~

~~Stitching shall be of the same type as is used in the actual glove construction.~~

~~**13.18.8.3**~~

~~Cut resistance testing shall be performed under a load of 75 g (2.5 oz).~~

~~**13.18.9** Specific Requirements for Testing Footwear Upper Materials.~~

~~**13.18.9.1**~~

~~Specimens shall consist of each composite of the footwear upper used in the actual footwear construction, excluding the tongue and gusset with layers arranged in proper order. Where a composite is identical to another composite except for additional reinforcement layer(s), the composite with no reinforcement layers shall be tested. Specimens shall not include seams.~~

~~**13.18.9.2**~~

~~Cut resistance testing shall be performed under a load of 350 g (12.3 oz).~~

~~**13.18.10** Specific Requirements for Testing Elastomeric Interface Materials.~~

~~**13.18.10.1**~~

~~Samples for conditioning shall be either elastomeric interface sheet material of a size that is sufficiently large to provide the required number of specimens or elastomeric interface material components such as formed hood gaskets.~~

~~**13.18.10.2**~~

~~Specimens shall be taken from elastomeric interface sheet material or elastomeric interface material components that are representative of the component material nominal thickness.~~

~~**13.18.10.3**~~

~~Cut resistance testing shall be performed under a load of 50 g (1.75 oz).~~

~~**13.19** Abrasion Resistance Test One.~~

~~**13.19.1** Application.~~

~~This test method shall apply to footwear soles.~~

~~**13.19.2** Sample Preparation.~~

~~**13.19.2.1**~~

~~Samples shall be uniform cylinders of footwear soles and heel material as specified in ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device* .~~

~~**13.19.2.2**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.19.3** Specimens.~~

~~**13.19.3.1**~~

~~Specimens shall be uniform cylinders of footwear soles and heel material as specified in ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device* .~~

~~**13.19.3.2**~~

~~At least three specimens shall be tested.~~

~~**13.19.4** Procedure.~~

~~Abrasion resistance shall be performed in accordance with ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device* , Method A, with a vertical force of 10 N over an abrasion distance of 40 m.~~

~~**13.19.5** Report.~~

~~The relative volume loss of each specimen shall be recorded and reported.~~

~~**13.19.6** Interpretation.~~

~~One or more footwear specimens failing this test shall constitute failing performance.~~

~~**13.20** Slip Resistance Test.~~

~~**13.20.1** Application.~~

~~This test method shall apply to footwear.~~

~~**13.20.2** Sample Preparation.~~

~~**13.20.2.1**~~

~~Samples shall be the whole footwear in men's size 9D, medium width.~~

~~**13.20.2.2**~~

~~Samples shall be conditioned as specified in ASTM F2913, *Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester* .~~

~~**13.20.3** Specimens.~~

~~**13.20.3.1**~~

~~Specimens shall be the whole footwear in men's size 9D, medium width.~~

~~**13.20.3.2**~~

~~At least three specimens shall be tested.~~

~~**13.20.4** Procedure.~~

~~Slip resistance shall be performed in accordance with ASTM F2913, *Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester* , in the following configurations. References to any other flooring and/or contaminant within ASTM F2913 shall not apply.~~

~~Footwear shall be tested both in the forepart and heel positions.~~

~~Footwear shall be tested in the wet condition.~~

~~Footwear shall be tested on a quarry tile surface that meets the specifications of ASTM F2913 and shall be calibrated in accordance with ASTM F2913. The calibration frequency of 10 tests specified in ASTM F2913 shall be equivalent to 50 test runs.~~

~~**13.20.5** Report.~~

~~13.20.5.1~~

~~The coefficient of friction of each specimen shall be reported.~~

~~13.20.5.2~~

~~The average coefficient of friction of all specimens for each configuration shall be calculated, recorded, and reported.~~

~~13.20.6~~ ~~Interpretation.~~

~~The average coefficient of friction for each configuration shall be used to determine pass/fail performance.~~

~~13.21~~ ~~Eyelet and Stud Post Attachment Test.~~

~~13.21.1~~ ~~Application.~~

~~This test method shall apply to protective footwear eyelets and stud posts.~~

~~13.21.2~~ ~~Specimens.~~

~~13.21.2.1~~

~~Specimens shall total two eyelets and two stud posts on three separate footwear items.~~

~~13.21.2.2~~

~~Specimens shall be removed from the footwear and shall be 25 mm × 50 mm (1 in. × 2 in.).~~

~~13.21.3~~ ~~Sample Preparation.~~

~~13.21.3.1~~

~~Samples for conditioning shall be whole footwear.~~

~~13.21.3.2~~

~~The eyelets or stud post specimens shall be conditioned as specified in 13.1.2 .~~

~~13.21.4~~ ~~Apparatus.~~

~~13.21.4.1~~

~~A tensile testing machine shall be used with a traverse rate of 50 mm/min (2 in./min).~~

~~13.21.4.2~~

~~Clamps measuring 25 mm × 38 mm (1 in. × 1 1⁄2 in.) shall have gripping surfaces that are parallel, flat, and capable of preventing slippage of the specimen during the test.~~

~~13.21.5~~ ~~Procedure.~~

~~13.21.5.1~~

~~The stud post or eyelet puller shall be inserted or attached to the upper position of the tensile machine.~~

~~13.21.5.2~~

~~The traverse rate shall be set at 50 mm/min (2 in./min). The test eyelet or stud post shall be attached using the appropriate puller fixture.~~

~~13.21.5.3~~

~~The eyelet stay shall be clamped, but clamping the base of the eyelets or stud hooks in the lower clamps shall not be permitted.~~

~~13.21.5.4~~

~~The distance between the clamps and stud hooks or eyelets shall be 2 mm to 3 mm ± 0.5 mm (1⁄16 in. to 1⁄8 in. ± 1⁄64 in.).~~

~~13.21.5.5~~

~~The test shall then be started.~~

~~13.21.6~~ ~~Report.~~

~~**13.21.6.1**~~

~~The force will reach a peak, decline slightly, and then increase to complete failure; however, the value at which the force first declines shall be recorded and reported as the initial failure point, as this is the separation point of the material around the eyelet or stud post.~~

~~**13.21.6.2**~~

~~The average force shall be calculated and reported.~~

~~**13.21.7** Interpretation.~~

~~The average force shall be used to determine pass/fail.~~

~~**13.22** Corrosion Resistance Test.~~

~~**13.22.1** Application.~~

~~This test method shall apply to hardware items on multiple-use eye and face protection devices, work gloves, footwear, and helmets.~~

~~**13.22.2** Specimens.~~

~~A total of five different items of each hardware type shall be tested.~~

~~**13.22.3** Sample Preparation.~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.22.4** Procedure.~~

~~**13.22.4.1**~~

~~Specimens shall be tested in accordance with ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus* . Salt spray shall be 5 percent saline solution, and test exposure shall be for 20 hours, +1/−0 hour.~~

~~**13.22.4.2**~~

~~Immediately following the test exposure and prior to examination, specimens shall be rinsed under warm, running tap water and dried with compressed air.~~

~~**13.22.4.3**~~

~~Specimens shall then be examined visually with the unaided eye to determine pass/fail.~~

~~**13.22.4.4**~~

~~The functionality of each specimen shall be evaluated.~~

~~**13.22.5** Report.~~

~~The presence of corrosion and the functionality of each specimen shall be recorded and reported.~~

~~**13.22.6** Interpretation.~~

~~One or more hardware specimens failing this test shall constitute failing performance for the hardware type.~~

~~**13.23** Overall Liquid Integrity Test Four.~~

~~**13.23.1** Application.~~

~~This test shall apply to protective footwear.~~

~~**13.23.2** Samples.~~

~~**13.23.2.1**~~

~~A minimum of three footwear items shall be tested.~~

~~**13.23.2.2**~~

~~Samples for conditioning shall be whole footwear.~~

~~**13.23.3** Specimen Preparation.~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.23.4** Procedure.~~

~~**13.23.4.1**~~

~~Protective footwear shall be tested in accordance with FIA Standard 1209, *Whole Shoe Flex* , with the following modifications:~~

~~Water shall not be used.~~

~~The flex speed shall be 60 cycles/min ± 2 cycles/min.~~

~~Alternative flexing equipment shall be permitted to be used when the flexing equipment meets the following parameters:~~

~~The alternative flexing equipment shall be capable of providing the angle of flex as described in FIA 1209.~~

~~The alternative flexing equipment shall be capable of a flex speed of 60 cycles/min ± 2 cycles/min.~~

~~The alternative flexing equipment shall provide a means of securing the footwear during flexing.~~

~~**13.23.4.2**~~

~~The test shall consist of 100,000 flexes.~~

~~**13.23.4.3**~~

~~After flexing, the outer sole shall be examined for evidence of sole separation. Separation occurring in this test shall be recorded and reported if it is at least 1.4 mm × 18 mm (0.05 in. × 0.7 in.) in any orientation.~~

~~**13.23.4.4**~~

~~After flexing and observation for separation, the footwear specimen shall be marked with a water height line on the exterior at a height of 75 mm (3 in.) below the height of the boot as defined in 6.4.2.3.1 and 6.4.3.2.1, but no lower than 75 mm (3 in.) for multiple-use emergency medical footwear or no lower than 50 mm (2 in.) for multiple-use medical care facility footwear, where measured up from the center of the insole at the heel.~~

~~**13.23.4.5**~~

~~The measurement shall be made on the interior and transferred to the exterior. Plain white paper toweling shall be placed inside the footwear specimen such that the paper toweling intimately contacts all areas inside the footwear specimen to at least the water height line.~~

~~**13.23.4.6***~~

~~The footwear specimen shall then be placed in a container that allows its immersion in tap water, treated with a dye and surfactant that achieves a surface tension of 35 dynes/cm ± 5 dynes/cm, to the water height line.~~

~~**A.13.23.4.6**~~

~~A 0.04-weight-percent solution of Surfynol 104H, or equivalent, with water gives a surface tension of 40 dynes/cm.~~

~~**13.23.4.7**~~

~~After 2 hours ± 10 minutes, the paper toweling shall be removed and examined for evidence of liquid leakage.~~

~~**13.23.5** Report.~~

~~Outer sole separation or the appearance of water leakage on the removed paper toweling shall be recorded and reported as failure for the tested specimen.~~

~~**13.23.6** Interpretation.~~

~~One or more footwear specimens failing this test shall constitute failing performance.~~

~~**13.24** Chemical Permeation Resistance Test.~~

~~**13.24.1** Application.~~

~~This test method shall apply to cleaning/utility glove materials.~~

~~**13.24.2** Specimens.~~

~~A minimum of three specimens shall be tested.~~

~~**13.24.3** Sample Preparation.~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.24.4** Procedure.~~

~~**13.24.4.1**~~

~~Permeation resistance shall be measured in accordance with ASTM F739, *Standard Test Method for Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Continuous Contact* , at 25°C ± 2°C (77°F ± 3°F), using the following test parameters and modifications:~~

~~A test duration of 1 hour shall be used.~~

~~The test shall be done in the closed loop configuration, using distilled water as the collection medium.~~

~~The selected method of detection shall have a sensitivity for measuring a cumulative permeation of 0.1 μg/cm ^{2} over the 1-hour test period. The actual sensitivity of the selected method of detection shall be determined.~~

~~The total cumulative permeation over 1 hour shall be measured in lieu of breakthrough time and permeation rate.~~

~~**13.24.4.2**~~

~~Permeation resistance shall be separately evaluated against the following chemicals:~~

~~40 ± 10 percent weight-for-weight (w/w) solution of glutaraldehyde~~

~~95 ± 10 percent w/w isopropanol~~

~~10 ± 1 percent solution of sodium hypochlorite (mixed within 72 hours of use)~~

~~Peracetic acid with a minimum of 30 ± 10 percent acetic acid~~

~~**13.24.5** Report.~~

~~**13.24.5.1**~~

~~The cumulative permeation in 1 hour shall be calculated, recorded, and reported in μg/cm ^{2} for each specimen for each challenge chemical.~~

~~**13.24.5.1.1**~~

~~If no challenge chemical is detected at the end of the 60-minute test period, then the cumulative permeation shall be recorded and reported as less than the minimum detectable mass per unit area for the specific chemical being tested.~~

~~**13.24.5.2**~~

~~The average cumulative permeation shall be calculated and reported by averaging the results from all specimens for each challenge chemical.~~

~~**13.24.5.2.1**~~

~~For the calculation of average cumulative permeation, if the results of one or more of the specimens tested is less than the minimum detectable cumulative permeation, then the minimum detectable cumulative permeation shall be used as the result for those specimens.~~

~~**13.24.5.2.2**~~

~~For the calculation of average cumulative permeation, if the results of all the specimens tested are less than the minimum detectable cumulative permeation, then the average cumulative permeation shall be reported as the minimum detectable cumulative permeation.~~

~~**13.24.5.3**~~

~~Any observations of degradation or other abnormalities at the conclusion of the testing of each specimen shall be reported.~~

~~**13.24.6** Interpretation.~~

~~The average cumulative permeation for each challenge chemical shall be used to determine pass or fail performance.~~

~~**13.25** Abrasion Resistance Test Two.~~

~~**13.25.1** Application.~~

~~**13.25.1.1**~~

~~This test shall apply to cleaning/utility glove, work glove, and footwear cover materials.~~

~~**13.25.1.2**~~

~~Modifications to this test method for testing cleaning/utility glove materials shall be as specified in 13.25.7 .~~

~~**13.25.1.3**~~

~~Modifications to this test method for testing work glove materials shall be as specified in 13.25.8 .~~

~~**13.25.1.4**~~

~~Modifications to this test method for testing work footwear cover wear surface materials shall be as specified in 13.25.9 .~~

~~**13.25.2** Specimens.~~

~~A minimum of five specimens shall be tested.~~

~~**13.25.3** Sample Preparation.~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.25.4** Procedure.~~

~~**13.25.4.1**~~

~~Specimens shall be tested in accordance with ASTM D3884, *Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method),* using a Calibrase H-18 wheel.~~

~~**13.25.4.2**~~

~~At the end of each abrasion exposure, the specimen shall be examined for evidence of wear-through. Wear-through shall be defined as the occurrence of one or more holes that permits the insertion of a 6.5 mm (1⁄4 in.) rod into the abraded area.~~

~~**13.25.5** Report.~~

~~The wear-through determination shall be recorded and reported for each specimen tested.~~

~~**13.25.6** Interpretation.~~

~~Any specimen showing wear-through shall constitute failure of this test.~~

~~**13.25.7** Specific Requirements for Testing Cleaning/Utility Gloves.~~

~~Testing shall be conducted under a load of 500 g, and specimens shall be examined after 1000 cycles.~~

~~**13.25.8** Specific Requirements for Testing Work Gloves.~~

~~**13.25.8.1**~~

~~Specimens shall be taken from the palm area of the gloves representative of the glove body composite construction at the following glove areas as described in 13.1.8 and shall not include seams: A-P, B-P, D-P, E-P, F-P, G-P, H-P, and I-P. Specimens shall be representative of each glove body composite construction. Samples and specimens shall be permitted to be materials representative of those used in the construction of the glove. Specimens shall consist of a separable layer outside the barrier layer of the glove composite.~~

~~**13.25.8.2**~~

~~Testing shall be conducted under a load of 500 g, and specimens shall be examined after 1000 cycles.~~

~~**13.25.8.3**~~

~~The layer outside the barrier layer in the work glove shall be examined for wear-through.~~

~~**13.25.9** Specific Requirements for Testing Footwear Cover Wear Surface Materials.~~

~~**13.25.9.1**~~

~~Specimens shall include all layers used in the construction of the footwear cover at the wear surface.~~

~~**13.25.9.2**~~

~~Testing shall be conducted under a load of 1000 g, and specimens shall be examined after 5000 cycles.~~

~~**13.25.9.3**~~

~~The combination of all layers shall be examined for wear-through.~~

~~**13.26** Dexterity Test Two.~~

~~**13.26.1** Application.~~

~~**13.26.1.1**~~

~~This test shall apply to cleaning/utility gloves and work gloves.~~

~~**13.26.1.2**~~

~~Modifications for testing work gloves shall be as specified in 13.25.8 .~~

~~**13.26.2** Specimens.~~

~~**13.26.2.1**~~

~~A minimum of three glove pairs each for small and large sizes shall be used for testing.~~

~~**13.26.2.2**~~

~~Each glove pair shall be tested as a complete set of gloves in new, as-distributed, condition.~~

~~**13.26.2.3**~~

~~Glove pair specimens shall not receive special softening treatments prior to tests.~~

~~**13.26.3** Sample Preparation.~~

~~**13.26.3.1**~~

~~Samples for conditioning shall be whole glove pairs.~~

~~**13.26.3.2**~~

~~Glove pair specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.26.4** Apparatus.~~

~~The test apparatus shall be as specified in ASTM F2010/F2010M, *Standard Test Method for Evaluation of Glove Effects on Wearer Finger Dexterity Using a Modified Pegboard Test* .~~

~~**13.26.5** Procedures.~~

~~Gloves shall be tested as specified in ASTM F2010/F2010M, *Standard Test Method for Evaluation of Glove Effects on Wearer Finger Dexterity Using a Modified Pegboard Test* .~~

~~**13.26.6** Report.~~

~~**13.26.6.1**~~

~~The average percent of barehanded control shall be recorded and reported for each test subject.~~

~~**13.26.6.2**~~

~~The average percent of barehanded control for all test subjects shall be calculated and reported for each size.~~

~~**13.26.7** Interpretation.~~

~~The average percent of barehanded control for size small and size large shall be used to determine pass or fail performance.~~

~~**13.27** Torque Test.~~

~~**13.27.1** Application.~~

~~This test method shall apply to work gloves.~~

~~**13.27.2** Specimens.~~

~~**13.27.2.1**~~

~~A minimum of three glove pairs each for small and large sizes shall be used for testing.~~

~~**13.27.2.2**~~

~~Each glove pair shall be tested as a complete set of gloves in new, as-distributed condition.~~

~~**13.27.2.3**~~

~~Glove pair specimens shall not receive special softening treatments prior to tests.~~

~~**13.27.2.4**~~

~~Glove pair specimens shall be tested for each material and construction combination.~~

~~**13.27.3** Sample Preparation.~~

~~**13.27.3.1**~~

~~Samples for conditioning shall be whole gloves.~~

~~**13.27.3.2**~~

~~Glove pair specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.27.4** Apparatus.~~

~~The apparatus shall be as specified in ASTM F2961, *Standard Test Method for Characterizing Gripping Performance of Gloves Using a Torque Meter* .~~

~~**13.27.5** Procedure.~~

~~The testing procedures shall be as specified in ASTM F2961, *Standard Test Method for Characterizing Gripping Performance of Gloves Using a Torque Meter* .~~

~~**13.27.6** Report.~~

~~**13.27.6.1**~~

~~The percent of barehanded control shall be recorded and reported for each test subject.~~

~~**13.27.6.2**~~

~~The average percentage of barehanded control value shall be recorded and reported for each specimen glove size.~~

~~**13.27.7** Interpretation.~~

~~**13.27.7.1**~~

~~The percentage of barehanded control value for size small and size large shall be used to determine pass or fail performance.~~

~~**13.27.7.2**~~

~~Failure of either size shall constitute failure of the test.~~

~~**13.28** Overall Liquid Integrity Test Three.~~

~~**13.28.1** Application.~~

~~This test method shall apply to work gloves that are not configured with either single-use emergency medical examination gloves or single-use emergency medical cleaning/utility gloves.~~

~~**13.28.2** Specimens.~~

~~A minimum of three glove pairs each for small and large sizes shall be used for testing.~~

~~**13.28.3** Sample Preparation.~~

~~**13.28.3.1**~~

~~Specimens shall be tested after being subjected to the procedure specified in 13.1.3 .~~

~~**13.28.3.2**~~

~~Specimens to be tested shall be conditioned as specified in 13.1.2 .~~

~~**13.28.4** Apparatus.~~

~~**13.28.4.1**~~

~~A water-markable glove shall cover all areas of the tester's hand. The water-markable glove shall be constructed of a fabric that is easily water-marked to determine leakage.~~

~~**13.28.4.2***~~

~~Water used for integrity testing shall be at a temperature of 20°C ± 3°C (68°F ± 5°F) and treated with a nonfoaming surfactant to achieve a surface tension of 35 dynes ± 2 dynes.~~

~~**A.13.28.4.2**~~

~~A 0.04-weight-percent solution of Surfynol 104H, or equivalent, with water gives a surface tension of 40 dynes/cm.~~

~~**13.28.4.3**~~

~~The following equipment shall be used for the test procedure:~~

- ~~A clear container(s) for submerging gloved hand(s)~~
- ~~A stopwatch~~

~~**13.28.5** Procedure.~~

~~**13.28.5.1**~~

~~Two test subjects, one for hand size small and one for hand size large, shall be selected such that their hand dimensions are as close as possible to the middle of the range for hand length and hand circumference as specified by the manufacturer for small and large gloves.~~

~~**13.28.5.2**~~

~~The wrist crease location shall be marked on each test specimen glove as described in 11.2.3 after the conditioning described in 13.28.3 . At the location of the wrist crease, the maximum water height line shall be drawn on each test specimen glove around the entire glove 50 mm (2 in.) +0/−3 mm (+0/−0.25 in.) toward the fingers. In the same manner, the minimum water height line shall be drawn on each test specimen glove 75 mm (3 in.) +0/−3 mm toward the fingers from the wrist crease around the entire glove +0/−3 mm (+0/−0.25 in.).~~

~~**13.28.5.3**~~

~~The test subject shall don the specimen(s) over the water-markable glove(s).~~

~~**13.28.5.4**~~

~~The test subject shall then immerse the donned glove specimens straight down into the surfactant treated water to between the minimum and maximum water height line for 5 minutes +30/−0 sec. An observer shall be present to ensure that the glove is not immersed beyond the maximum water height line.~~

~~**13.28.5.5**~~

~~If the test subject immerses the glove beyond the maximum water height line, the glove shall be retested after air drying and conditioning as specified in 13.1.3 .~~

~~**13.28.5.6**~~

~~The test subject shall flex the glove specimen in a gentle, complete (but not tight) fist-clenching motion until the fingertips touch the palm every 10 seconds with each fist-clenching motion taking 10 seconds, +2/−2 seconds to complete.~~

~~**13.28.6** Report.~~

~~The appearance of water marks on the inner glove after testing any of the glove pairs shall be recorded and reported.~~

~~**13.28.7** Interpretation.~~

~~The appearance of water marks on the inner glove after testing any glove shall be considered leakage and shall constitute failing performance.~~

~~**13.29** Tactility Test.~~

~~**13.29.1** Application.~~

~~**13.29.1.1**~~

~~This test shall apply to cleaning/utility gloves and work gloves.~~

~~**13.29.1.2**~~

~~Modifications to this test method for testing cleaning/utility gloves shall be as specified in 13.29.7 .~~

~~**13.29.1.3**~~

~~Modifications to this test method for testing work gloves shall be as specified in 13.29.8 .~~

~~**13.29.2** Specimens.~~

~~**13.29.2.1**~~

~~A minimum of three glove pairs each for two different sizes shall be used for testing.~~

~~**13.29.2.2**~~

~~Each glove pair shall be tested as a complete set of gloves in new, as-distributed condition.~~

~~**13.29.2.3**~~

~~Glove pair specimens shall not receive special softening treatments prior to tests.~~

~~**13.29.3** Sample Preparation.~~

~~**13.29.3.1**~~

~~Samples for conditioning shall be whole glove pairs.~~

~~**13.29.3.2**~~

~~Glove pair specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.29.4** Procedures.~~

~~**13.29.4.1**~~

~~A separate test subject shall be used for each pair of gloves to be evaluated.~~

~~**13.29.4.2**~~

~~Test subjects shall be selected such that their hand dimensions conform to the offered respective sizes for each glove.~~

~~**13.29.4.3**~~

~~Ten metal pins having diameters of 11 mm (0.430 in.), 9.5 mm (0.370 in.), 8 mm (0.310 in.), 6.5 mm (0.260 in.), 5 mm (0.200 in.), 3.5 mm (0.138 in.), 2.5 mm (0.098 in.), 1.5 mm (0.058 in.), 0.5 mm (0.018 in.), and 0.2 mm (0.008 in.), which have a length of 50 mm ± 10 mm (2 in. ± 0.4 in.), shall be used.~~

~~**13.29.4.4**~~

~~With each of the metal pins lying on a flat, smooth surface at a spacing of 100 mm ± 20 mm (4 in. ± 0.8 in.), the test subject shall attempt to pick up each pin starting with the largest diameter pin. The test subject shall be provided a period of 10 seconds to complete picking up each pin with his/her finger and thumb and then shall hold the pin for a minimum of 10 seconds without changing the position of his/her hand. The test subject shall not pick up the pins by their ends.~~

~~**13.29.5** Report.~~

~~**13.29.5.1**~~

~~The diameter of the smallest pin that can be successfully picked up shall be recorded and reported for each test subject.~~

~~**13.29.5.2**~~

~~The average diameter that can be successfully picked up by all test subjects shall be calculated and reported for each size.~~

~~**13.29.6** Interpretation.~~

~~The average diameter of the smallest pin that can be picked up for each size shall be used to determine pass/fail performance.~~

~~**13.29.7** Specific Requirements for Testing Cleaning/Utility Gloves.~~

~~The sizes selected for testing shall represent the smallest and largest sized gloves that are available for the specific style of glove being evaluated.~~

~~**13.29.8** Specific Requirements for Testing Work Gloves.~~

~~Size small and size large shall be evaluated.~~

~~**13.30** Water Absorption Resistance Test.~~

~~**13.30.1** Application.~~

~~This test method shall apply to the multiple-use garment materials.~~

~~**13.30.2** Sample Preparation.~~

~~**13.30.2.1**~~

~~Samples for conditioning shall be at least 1 m (1 yd) square of each material.~~

~~**13.30.2.2**~~

~~Specimens shall be conditioned as specified in 8.1.3 followed by conditioning as specified in 13.1.2 .~~

~~**13.30.3** Specimens.~~

~~**13.30.3.1**~~

~~Specimens shall be 200 mm × 200 mm (8 in. × 8 in.).~~

~~**13.30.3.2**~~

~~At least three (3) specimens shall be tested.~~

~~**13.30.4** Apparatus.~~

~~The test apparatus shall be as specified in AATCC 42, *Test Method for Water Resistance: Impact Penetration* , with the following modifications:~~

~~A metal roller 113 mm ± 6 mm (4 1⁄2 in. ± 1⁄4 in.) long and weighing 1 kg (2 1⁄4 lb) shall be used.~~

~~Embroidery hoops measuring 150 mm to 180 mm (6 in. to 7 in.) in diameter shall be used for mounting the specimen.~~

~~**13.30.5** Procedure.~~

~~**13.30.5.1**~~

~~The conditioned specimen shall be securely mounted in the embroidery hoops with sufficient tension to ensure a uniformly smooth surface.~~

~~**13.30.5.2**~~

~~The direction of the flow of water down the specimen shall coincide with the warpwise direction of the specimen as placed on the stand.~~

~~**13.30.5.3**~~

~~The mounted specimen shall be placed on the block with the center of the specimen directly beneath the center of the nozzle and the plane of the surface of the specimen at a 45 degree angle with the horizontal.~~

~~**13.30.5.4**~~

~~A 500 ml volume of distilled water at a temperature of 27°C ± 1°C (80°F ± 2°F) shall be poured quickly into the funnel and allowed to spray onto the specimen.~~

~~**13.30.5.5**~~

~~The following operations shall then be executed as rapidly as possible:~~

~~The specimen shall be removed from the hoops and placed between sheets of blotting paper on a flat horizontal surface. The metal roller shall be rolled quickly forward and back one time over the paper without application of any pressure other than the weight of the roller.~~

~~A square 100 × 100 mm (4 in. × 4 in.) shall be cut out of the center of the wet portion of the specimen and weighed to the nearest 0.05 g. This weight shall be designated the "wet weight." Not more than 30 seconds shall elapse between the time the water has ceased flowing through the spray nozzle and the start of the weighing.~~

~~The same 100 mm (4 in.) square shall be conditioned as specified in 13.1.2 until it has dried and reached moisture equilibrium with the surrounding standard atmosphere for textiles. Following this conditioning it shall be reweighed. This weight shall be designated the "dry weight."~~

~~**13.30.5.6**~~

~~The percent water absorption shall be calculated using the following equation:~~

$$\text{Percent water absorption} = [(\text{Wet Weight} - \text{Dry Weight})/(\text{Dry Weight})] \times 100$$ DELETED ~~[23.31.5.6]~~

~~**13.30.6** Report.~~

~~The percent water absorption for each specimen shall be reported. The average percent water absorption for all tested specimens shall be calculated and reported.~~

~~**13.30.7** Interpretation.~~

~~The average percent water absorption shall be used to determine pass/fail performance.~~

~~**13.31** Total Heat Loss Test.~~

~~**13.31.1** Application.~~

~~This test method shall apply to the protective garment composites.~~

~~**13.31.2** Specimens.~~

~~**13.31.2.1**~~

~~Total heat loss testing shall be conducted on at least three specimens.~~

~~**13.31.2.2**~~

~~Specimens shall consist of all layers in the protective garment composite arranged in the order and orientation as worn.~~

~~**13.31.2.3**~~

~~Specimen composite shall consist of base composite layers only required to meet the specifications of this standard. Specimens shall not include layers added for reinforcement, or externally added materials for visibility or identification.~~

~~**13.31.3** Sample Preparation.~~

~~**13.31.3.1**~~

~~Samples for conditioning shall be at least a 1 m (1 yd) square of each material.~~

~~**13.31.3.2**~~

~~Specimens to be tested shall be conditioned as specified in 13.1.2 .~~

~~**13.31.4** Apparatus.~~

~~The test apparatus shall be as specified in ASTM F1868, *Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate* .~~

~~**13.31.5*** Procedure.~~

~~Testing shall be conducted in accordance with Part C of ASTM F1868, *Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate* , with the following modifications:~~

~~The specimen shall be placed on the test plate with the side normally facing the human body toward the test plate.~~

~~For multiple layers, the layers shall be arranged in the order and orientation as worn.~~

~~Each layer shall be smoothed by hand to eliminate wrinkles or bubbles in each layer and, if necessary, the edges shall be secured.~~

~~Once the test is started, no further adjustments to the specimen shall be made.~~

~~**A.13.31.5**~~

~~These modifications should be used instead of Note 6 in ASTM F1868, Part C.~~

~~**13.31.6** Report.~~

~~**13.31.6.1**~~

~~The average intrinsic thermal resistance (*Rcf*) of the sample shall be recorded and reported.~~

~~**13.31.6.2**~~

~~The average apparent intrinsic evaporative resistance (*ARef*) of the sample shall be recorded and reported.~~

~~**13.31.6.3**~~

~~The average total heat loss (*Qt*) of the sample shall be calculated and reported.~~

~~**13.31.7** Interpretation.~~

~~Pass/fail determination shall be based on the average reported total heat loss measurement of all specimens tested.~~

~~**13.32** Label Durability and Legibility Test.~~

~~**13.32.1** Application.~~

~~**13.32.1.1**~~

~~This test shall apply to multiple-use garments, footwear, and work glove labels.~~

~~**13.32.1.2**~~

~~Modifications to this test method for testing multiple-use garment labels shall be as specified in 13.32.7 .~~

~~**13.32.1.3**~~

~~Modifications to this test method for testing footwear and work glove labels shall be as specified in 13.32.8 .~~

~~**13.32.2** Specimens.~~

~~**13.32.2.1**~~

~~A minimum of three specimens for each type of label shall be tested.~~

~~**13.32.2.2**~~

~~If labels have areas of “write-in” information, the specimens shall include those areas with the sample information written in.~~

~~**13.32.3** Sample Preparation.~~

~~Samples shall be prepared as specified in the respective section for each item.~~

~~**13.32.4** Procedure.~~

~~Specimens shall be examined for legibility to the unaided eye by a person with 20/20 vision, or vision corrected to 20/20, at a nominal distance of 305 mm (12 in.) in a well-illuminated area.~~

~~**13.32.5** Report.~~

~~The legibility for each specimen shall be recorded and reported as acceptable or unacceptable.~~

~~**13.32.6** Interpretation.~~

~~One or more label specimens failing this test shall constitute failing performance.~~

~~**13.32.7** Specific Requirements for Testing Multiple-Use Garment Labels.~~

~~**13.32.7.1**~~

~~Samples for conditioning shall be at least 1 m^2 (1 yd^2) of material.~~

~~**13.32.7.2**~~

~~Multiple-use garment samples shall be conditioned as specified in 13.1.3 .~~

~~**13.32.7.3**~~

~~For multiple-use garments, additional samples of individual labels shall be conditioned only as specified in 13.1.6 .~~

~~**13.32.8** Specific Requirements for Testing Footwear and Work Glove Labels.~~

~~**13.32.8.1**~~

~~Samples for conditioning shall be individual labels.~~

~~**13.32.8.2**~~

~~Individual labels only shall be conditioned as specified in 13.1.6 .~~

~~**13.33** Retroreflectivity Test.~~

~~**13.33.1** Application.~~

~~**13.33.1.1**~~

~~This test method shall apply to helmet visibility marking materials.~~

~~**13.33.1.2**~~

~~Visibility materials shall be tested for each procedure specified in 13.33.4 .~~

~~**13.33.2** Specimens.~~

~~**13.33.2.1**~~

~~A minimum of three test specimens shall be tested.~~

~~**13.33.2.2**~~

~~Specimens of retroreflective material shall be 100 mm (4 in.) in length by the width of the finished trim product.~~

~~**13.33.2.2.1**~~

~~Where retroreflective and nonretroreflective surface areas are combined to form a combined performance material, the specimen shall consist of the retroreflective and nonretroreflective portions of the finished combined performance material.~~

~~**13.33.3** Sample Preparation.~~

~~**13.33.3.1**~~

~~Samples for conditioning shall include 305 mm (12 in.) sections of visibility markings that are sewn onto ballast materials that meet the requirements of AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics* .~~

~~**13.33.3.2**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.33.4** Procedures.~~

~~**13.33.4.1** Measurement of Coefficient of Retroreflection.~~

~~**13.33.4.1.1**~~

~~The coefficient of retroreflection~~ ~~*(R* $_a$ *)*~~ ~~shall be determined in accordance with ASTM E809,~~ ~~*Standard Practice for Measuring Photometric Characteristics of Retroreflectors*~~ ~~, using the following modifications:~~

~~Test distance shall equal 15.2 m (50 ft).~~

~~Observation angle shall equal 0.2 degree.~~

~~Entrance angle shall equal 5 degrees.~~

~~Receiver shall be provided with an entrance aperture of 25 mm (1 in.) ± 5 percent in diameter that is equivalent to 0.1 degree angular aperture.~~

~~Exit aperture of the source shall be circular and 25 mm (1 in.) ± 5 percent in diameter that corresponds to 0.1 degree angular aperture.~~

~~Retroreflector reference angles shall equal 0 and 90 degrees.~~

~~The datum mark shall be placed as specified by the trim manufacturer.~~

~~**13.33.4.1.2**~~

~~The coefficient of retroreflection~~ ~~*(R* $_a$ *)*~~ ~~shall be calculated by the following equation:~~

$$R_a = R_I / A_r$$ DELETED ~~**[23.34.4.1.2]**~~

~~where:~~

~~R_I = coefficient of luminous intensity measured as specified in 13.33.4.1.1~~

~~A_r = only the retroreflective surface area of the trim test specimen's surface area~~

~~**13.33.4.1.2.1**~~

~~A_r shall be calculated by subtracting the nonretroreflective surface area from the test specimen's total surface area.~~

~~**13.33.4.2** Rainfall Test.~~

~~**13.33.4.2.1**~~

~~Specimens of visibility markings shall be tested for retroreflectivity when wet as specified in Appendix A of ANSI/ISEA 107,~~ ~~*American National Standard for High-Visibility Safety Apparel and Accessories*~~ ~~.~~

~~**13.33.4.2.2**~~

~~The coefficient of retroreflection (R_a) shall be measured as specified in 13.36.4.1 , 2 minutes ± 15 seconds after the rainfall has started.~~

~~**13.33.5** Report.~~

~~The coefficient of retroreflection~~ ~~*(R* $_a$ *)*~~ ~~shall be recorded and reported for each specimen. The average R_a of all specimens shall be calculated and reported separately for each of the test procedures specified in 13.33.4.1 .~~

~~**13.33.6** Interpretation.~~

~~For trim retroreflectivity, pass or fail performance shall be determined using the average coefficient of retroreflection~~ ~~*(R* $_a$ *)*~~ ~~for the procedures specified in 13.33.4.1 .~~

~~**13.34** Flammability Test.~~

~~**13.34.1** Application.~~

~~**13.34.1.1**~~

~~This test shall apply to materials used in single-use garments, single-use eye and face protection devices, and footwear covers.~~

~~**13.34.1.2**~~

~~Modifications to this test method for testing footwear covers and single-use garments shall be as specified in 13.34.7 .~~

~~**13.34.1.3**~~

~~Modifications to this test method for testing single-use eye and face protection devices shall be as specified in 13.34.8 .~~

~~**13.34.2** Specimens.~~

~~A minimum of five specimens shall be tested.~~

~~**13.34.3** Sample Preparation.~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.34.4** Procedure.~~

~~Specimens shall be tested in accordance with ASTM D1230, *Standard Test Method for Flammability of Apparel Textiles* , with the following modifications:~~

~~Sample preparation and conditioning shall be as specified in this section.~~

~~The specimens shall be positioned in the flammability tester specimen holder so that the tip of the flame contacts the bottom edge of the specimen.~~

~~The time of flame application shall be 1 second.~~

~~**13.34.5** Report.~~

~~**13.34.5.1**~~

~~The flame spread time for each specimen shall be reported to the nearest 0.1 second.~~

~~**13.34.5.2**~~

~~The average flame spread time for all specimens shall be reported.~~

~~**13.34.5.3**~~

~~Specimens that do not ignite shall be recorded as “Did not ignite” and shall not be included in the average flame spread time.~~

~~**13.34.5.4**~~

~~Specimens that ignite, but whose flame is extinguished before reaching the stop cord, shall be recorded as “Ignited but extinguished” and shall not be included in the average flame spread time.~~

~~**13.34.6** Interpretation.~~

~~**13.34.6.1**~~

~~Pass/fail performance shall be based on the average flame spread time.~~

~~**13.34.6.2**~~

~~If no specimens have a recorded flame spread time because the specimens did not ignite or did ignite but were extinguished, the material performance shall be interpreted as passing.~~

~~**13.34.7** Specific Requirements for Footwear Covers and Single-Use Garments.~~

~~**13.34.7.1**~~

~~Where the footwear cover or garment is constructed of several separable layers, each separable layer of garment material shall be tested.~~

~~**13.34.7.2**~~

~~Five specimens in each of the warp and fill directions shall be tested from each sample unit.~~

~~**13.34.7.3**~~

~~Samples for conditioning shall be the entire complete footwear cover or garment.~~

~~**13.34.7.4**~~

~~Pass/fail performance shall be based on the average flame spread time in the warp and fill directions.~~

~~**13.34.7.5**~~

~~Failure in any one direction constitutes failure for the material.~~

~~**13.34.8** Specific Requirements for Single-Use Eye and Face Protection Devices.~~

~~**13.34.8.1**~~

~~Samples for testing shall only be taken from the textile portions of the eye and face protection device, where applicable.~~

~~**13.34.8.2**~~

~~If specimens do not meet the size requirements as specified in ASTM D1230, *Standard Test Method for Flammability of Apparel Textiles* , then sections of inherently flame-resistant material shall be attached to the sides of specimens to meet the specimen width of 50 mm (2 in.).~~

~~**13.35** Suspension System Retention Test.~~

~~**13.35.1** Application.~~

~~This test shall apply to helmets.~~

~~**13.35.2** Sample Preparation.~~

~~**13.35.2.1**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.35.2.2**~~

~~Samples for conditioning shall be whole helmets.~~

~~**13.35.3** Specimens.~~

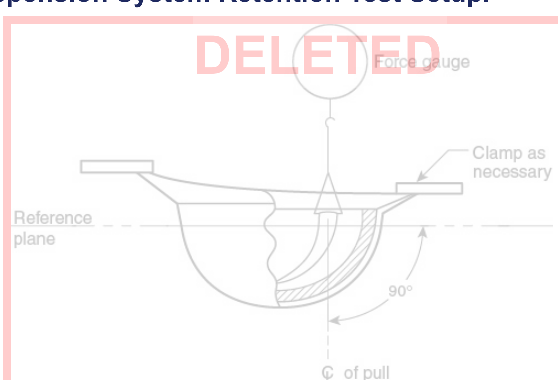
~~A minimum of three complete helmets shall be tested.~~

~~**13.35.4** Apparatus.~~

~~**13.35.4.1**~~

~~The suspension system retention test fixtures shall consist of rigid material of sufficient thickness and optional design to facilitate fire attachment to the helmet suspension and the tensile test machine as shown in Figure 13.35.4.1 .~~

~~**Figure 13.35.4.1 Suspension System Retention Test Setup.**~~



~~**13.35.4.2**~~

~~The calibrated tensile test machine shall be capable of measuring the force applied to the retention system within 2 percent of the specified forces.~~

~~**13.35.5** Procedure.~~

~~**13.35.5.1**~~

~~Each helmet suspension strap shall be cut such that sufficient length of strap remains to be gripped by the movable jaw of the testing machine.~~

~~**13.35.5.2**~~

~~Specimens shall be positioned and secured in the tensile testing machine so that the helmet's reference plane is horizontal.~~

~~**13.35.5.3**~~

~~Each attachment point of the crown strap shall be tested by applying a pull force perpendicular to the reference plane to a maximum load of 23 N +1/−0 N (5 lbf +0.25/−0 lbf). The force shall be increased from 0 N to 23 N at a load rate of 25 mm/min ± 5 mm (1 in./min ± $^3/_{16}$ in.).~~

~~**13.35.5.4**~~

~~After application of the force is complete, the load shall be released and the suspension system shall be inspected for any separation from the helmet shell.~~

~~**13.35.5.5**~~

~~Each adjusting mechanism of the helmet suspension system assembly shall be secured and unsecured, as applicable, for 20 repetitions.~~

~~**13.35.6** Report.~~

~~**13.35.6.1**~~

~~The individual pass/fail results for each attachment point shall be recorded.~~

~~**13.35.6.2**~~

~~Each adjusting mechanism of the helmet suspension system shall be observed for proper functioning to determine pass or fail.~~

~~**13.35.7** Interpretation.~~

~~**13.35.7.1**~~

~~Separation of the helmet suspension from the helmet shall constitute failing performance.~~

~~**13.35.7.2**~~

~~One or more helmet specimens failing this test shall constitute failing performance.~~

~~**13.36** Retention System Test.~~

~~**13.36.1** Application.~~

~~This test shall apply to helmets.~~

~~**13.36.2** Sample Preparation.~~

~~**13.36.2.1**~~

~~Samples for conditioning shall be whole helmets.~~

~~**13.36.2.2**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.36.3** Specimens.~~

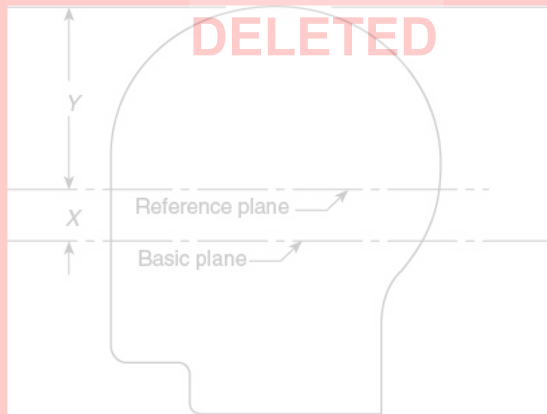
~~A minimum of five complete helmets shall be tested.~~

~~**13.36.4** Apparatus.~~

~~**13.36.4.1**~~

~~An ISO size J headform conforming to the nominal dimensions in Figure 13.36.4.1 shall be used.~~

~~**Figure 13.36.4.1 Location of Reference Plane.**~~

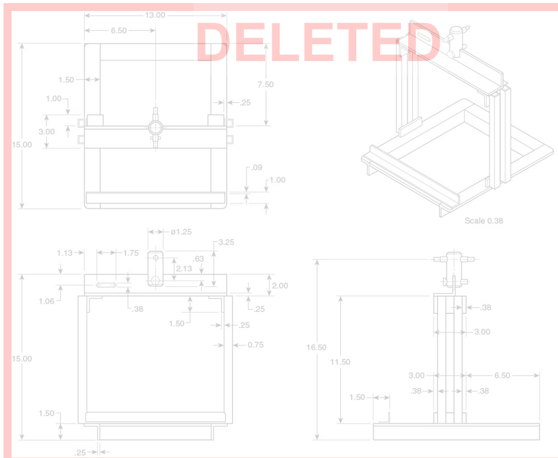


Headform	Size (mm)	X (mm)	Y (mm)
A	500	24	90
B	540	26	96
J	570	27.5	102.5
M	600	29	107
O	620	30	110

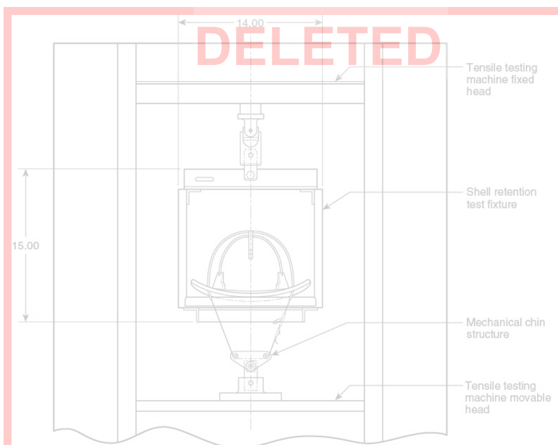
~~**13.36.4.2**~~

~~A mechanical chin structure shall be designed for use with a calibrated tensile test machine. The mechanical chin structure shall consist of two rollers 13 mm (1/2 in.) in diameter with centers that are 75 mm (3 in.) apart. The mechanical chin structure shall conform with Figure 13.36.4.2(a), Figure 13.36.4.2(b), and Figure 13.36.4.2(c).~~

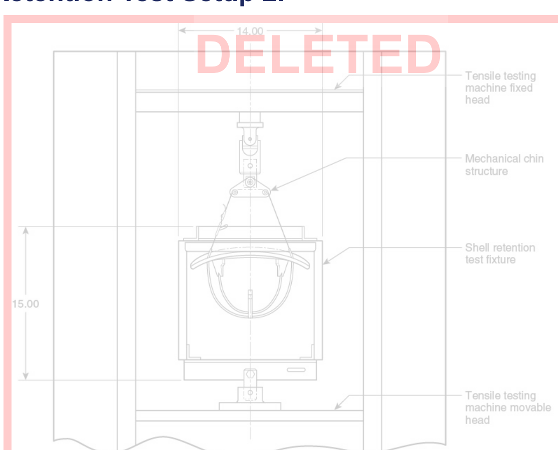
~~**Figure 13.36.4.2(a) Retention Test Fixture.**~~



~~**Figure 13.36.4.2(b) Retention Test Setup 1.**~~



~~**Figure 13.36.4.2(c) Retention Test Setup 2.**~~



~~**13.36.4.3**~~

~~The calibrated tensile test machine shall be capable of measuring the force applied to the retention system within 2 percent at the specific force.~~

~~**13.36.5** Procedure.~~

~~**13.36.5.1**~~

~~The test shall be conducted at an ambient temperature of 20°C to 28°C (68°F to 82°F), and the relative humidity shall be 30 percent to 70 percent.~~

~~**13.36.5.2**~~

~~Prior to testing, the test machine shall be allowed to warm up until stability is achieved.~~

~~**13.36.5.3**~~

~~The headform and mechanical chin structure shall be positioned so that the vertical straight line distance between the bottom of the rollers and the crown of the headform is 200 mm ± 10 mm (8 in. ± 3⁄8 in.). The chin strap shall be passed around the rollers, and the helmet shall be secured to the headform. The chin strap shall be adjusted and preloaded to 45 N ± 5 N (10 lbf ± 1 lbf). The distance between the top of the helmet and the rollers shall be measured and recorded to the nearest 0.5 mm (1⁄64 in.).~~

~~**13.36.5.4**~~

~~The force applied to the retention system shall be slowly increased to 225 N/sec + 5 N/sec (50 lbf/sec + 1 lbf/sec).~~

~~**13.36.5.5**~~

~~Where using a tensile testing machine, the load rate shall be 25 mm/min (1 in./min) to a limit of 225 N (50 lbf).~~

~~**13.36.5.6**~~

~~The distance between the top of the helmet and the bottom of the rollers shall be measured and recorded again after the force has been maintained at 225 N ± 5 N (50 lbf ± 1 lbf) for 60 seconds +5/-0 seconds. The difference between the second measurement and the first shall be the retention system elongation.~~

~~**13.36.5.7**~~

~~In addition, each adjusting mechanism of the helmet chin strap assembly shall be secured and unsecured, as applicable, for 20 repetitions.~~

~~**13.36.6** Report.~~

~~**13.36.6.1**~~

~~The retention system elongation shall be measured, recorded, and reported for each helmet specimen.~~

~~**13.36.6.2**~~

~~Each mechanism shall be observed for proper functioning to determine pass or fail.~~

~~**13.36.7** Interpretation.~~

~~One or more helmet specimens failing this test constitutes failing performance.~~

~~**13.37** Goggle and Headlamp Clip Attachment Test.~~

~~**13.37.1** Application.~~

~~This test method shall apply to goggle and headlamp clips on protective helmets, where present.~~

~~**13.37.2** Sample Preparation.~~

~~**13.37.2.1**~~

~~Specimens shall be conditioned as specified in 13.1.2 .~~

~~**13.37.2.2**~~

~~Samples for conditioning shall be complete helmets with goggle and headlamp clips in place.~~

~~**13.37.3** Specimens.~~

~~A minimum of three helmets with goggle and headlamp clips shall be tested for each test.~~

~~**13.37.4** Apparatus.~~

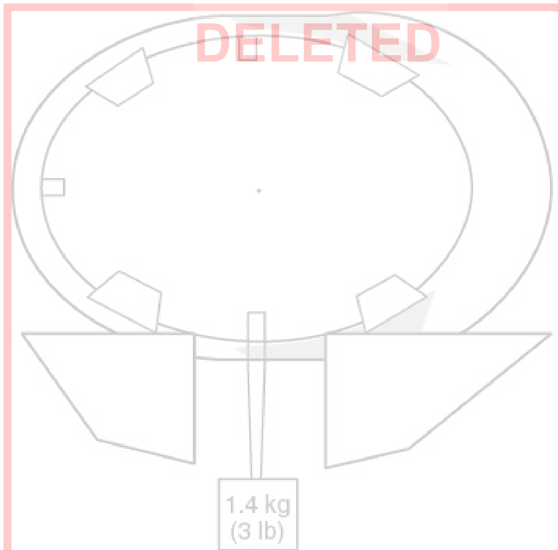
~~The test fixture shall consist of a 1.4 kg (3 lb) weight attached to a 1 mm (1⁄32 in.) diameter wire loop.~~

~~**13.37.5** Procedure.~~

~~**13.37.5.1**~~

~~The helmet shall be turned on edge with the clip to be tested facing directly down and supported on the brim except directly beneath the clip as shown in Figure 13.37.5.1 .~~

~~**Figure 13.37.5.1 Test Setup (Side View of Top of Helmet).**~~



~~**13.37.5.2**~~

~~The wire shall be looped under the clip and, without allowing any vertical drop, the weight shall be suspended from the clip.~~

~~**13.37.5.3**~~

~~After 5 seconds +2/−0 seconds, the clip shall be inspected to determine if it has pulled away from the helmet or deformed more than 6 mm (1⁄4 in.) from its original position, either of which constitutes a failure.~~

~~**13.37.6** Report.~~

~~The individual pass/fail results for each specimen and clip shall be recorded.~~

~~**13.37.7** Interpretation.~~

~~One or more helmet specimens failing this test constitutes failing performance.~~

~~**13.38** Fastener Tape Strength Test.~~

~~**13.38.1** Application.~~

~~This test shall apply to fastener tape used in the construction of garments.~~

~~**13.38.2** Samples.~~

~~**13.38.2.1**~~

~~Sample size shall be defined in the A-A-55126B, *Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic* .~~

~~**13.38.2.2**~~

~~Samples shall be washed for three washings as specified in AATCC 61, *Test Method for Colorfastness to Laundering: Accelerated* using the laundering conditions established for Test 3A.~~

~~**13.38.3** Specimens.~~

~~A minimum of four specimens shall be evaluated.~~

~~**13.38.4** Procedures.~~

~~**13.38.4.1**~~

~~Fastener tape breaking strength shall be measured in accordance with ASTM D5034, *Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)* , with the following modifications:~~

~~Specimens shall be tested in the provided width only in lieu of the specified 100 mm (3.9 in.) width.~~

~~Only specimens parallel to the length of the tape shall be tested.~~

~~**13.38.4.2**~~

~~Fastener tape shear strength shall be measured in accordance with ASTM D5169, *Standard Test Method for Shear Strength (Dynamic Method) of Hook and Loop Touch Fasteners* .~~

~~**13.38.4.3**~~

~~Fastener tape shear strength shall be measured in accordance with ASTM D5170, *Standard Test Method for Peel Strength ("T" Method) of Hook and Loop Touch Fasteners* .~~

~~**13.38.5** Report.~~

~~The average breaking strength, shear strength, and peel strength shall be calculated and recorded.~~

~~**13.38.6** Interpretation.~~

~~Pass or fail determinations shall be based on the average breaking strength, shear strength, and peel strength specified for Type 2, Class 1 and 4 fastener tapes, as established in Table 1 of A-A-55126B, *Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic* .~~

~~**13.39** Overall Ensemble Function and Integrity Test.~~

~~**13.39.1** Application.~~

~~**13.39.1.1**~~

~~This test method shall apply to ensembles and full body garments that at least cover the upper and lower torso, arms, and legs.~~

~~**13.39.1.2**~~

~~Modifications to the test method for testing single-use garments or ensembles shall be as specified in 13.39.8 .~~

~~**13.39.1.3**~~

~~Modifications to the test method for testing multiple-use garments or ensembles shall be as specified in 13.39.9 .~~

~~**13.39.2** Sample Preparation.~~

~~Samples shall be complete ensembles.~~

~~**13.39.3** Specimens.~~

~~**13.39.3.1**~~

~~Specimens shall be complete ensembles.~~

~~**13.39.3.2**~~

~~At least three specimens shall be tested using a different test subject for each specimen.~~

~~**13.39.3.3**~~

~~Where the vapor-protective ensemble consists of multiple separate layers, and outer layers are not considered gastight, then only the portion of the vapor-protective suit that is considered gastight shall be tested.~~

~~**13.39.4** Apparatus.~~

~~The equipment and supplies specified in ASTM F1154, *Standard Practices for Evaluating the Comfort, Fit, Function, and Durability of Protective Ensembles, Ensemble Elements, and Other Components* , shall be used along with the following additional items:~~

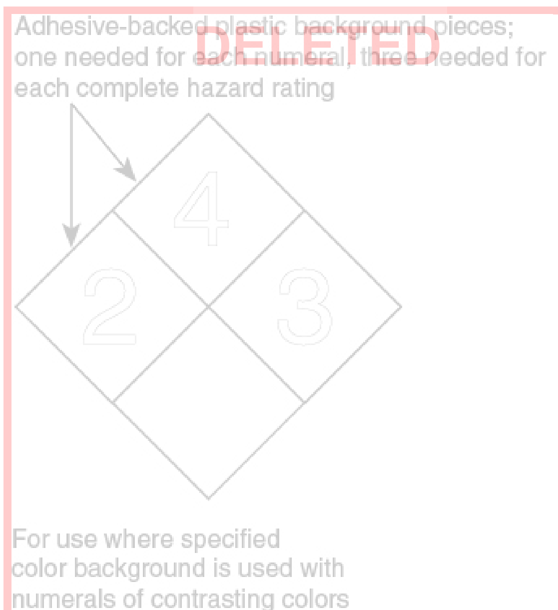
~~A Snellen eye chart for a 6 m (20 ft) distance~~

~~A stopwatch or other timing device~~

~~A protractor or other device to measure the angle of the placard relative to the test subject~~

~~An NFPA 704 -based placard as seen in Figure 13.39.4~~

~~**Figure 13.39.4 NFPA Placard.**~~



~~**13.39.5** Procedure.~~

~~**13.39.5.1**~~

~~Ensemble or garment overall function and integrity shall be measured in accordance with ASTM F1154, *Standard Practices for Evaluating the Comfort, Fit, Function, and Durability of Protective Ensembles, Ensemble Elements, and Other Components* , with the following parameters:~~

~~Exercise Procedure A and the ladder climb exercise in Paragraph 8.9.7 of Procedure B shall be used.~~

~~Ensembles tested shall meet the sizing range of the test subject as determined in 5.3.1.4 of ASTM F1154. The garment shall be donned in accordance with the manufacturer's instructions.~~

~~Testing shall be conducted at 25°C ± 7°C (77°F ± 10°F) and relative humidity of 50 percent ± 20 percent.~~

~~Test subjects shall wear underclothing in accordance with the manufacturer's recommendations, or in lieu of a detailed recommendation, a full body coverall.~~

~~13.39.5.2~~

~~Visual acuity testing shall be conducted using the eye chart, with a normal lighting range of 100 through 150 ft candles at the chart and with the test subject positions at a distance of 6.1 m (20 ft) from the chart.~~

~~13.39.5.2.1~~

~~The test subject shall have a minimum visual acuity of 20/20 in each eye, uncorrected or corrected with contact lenses, as determined in a visual acuity test or doctor's examination.~~

~~13.39.5.2.2~~

~~The test subject shall read the standard eye chart through the facepiece, visor, or eye/face protection device to determine its impact on the test subject's visual acuity.~~

~~13.39.5.3~~

~~The field of vision for the test subject shall be assessed by determining the angular degree to the left and right where the test subject can read a word of four random letters 10 mm (0.4 in.) high from a distance of 6 m (20 ft) that is 2 m (6 ft) off of the ground.~~

~~13.39.5.4~~

~~Following the completion of the function tests on the garment or ensemble, the specimen shall be subjected to liquidtight integrity testing as specified in Section 13.2 .~~

~~13.39.6~~ ~~Report.~~

~~13.39.6.1~~

~~The measure of the ability of the test subject to complete all exercises shall be measured and reported.~~

~~13.39.6.2~~

~~The visual acuity of the test subject when in and out of the ensemble shall be recorded and reported.~~

~~13.39.6.3~~

~~The angular degree for both the left and right defining the field of vision shall be measured and reported. The average angular degree for the left and right field of vision for all test subjects shall be calculated and reported.~~

~~13.39.6.4~~

~~A diagram shall be prepared for each test that identifies the locations of any liquid leakage detected on the liquid-absorptive garment inside the specimen.~~

~~13.39.7~~ ~~Interpretation.~~

~~13.39.7.1~~

~~The ability for the test subject to fully complete all exercises shall be measured and reported.~~

~~13.39.7.2~~

~~The visual acuity of the test subject when inside the ensemble shall be used for determining pass or fail performance.~~

~~13.39.7.3~~

~~The average left and average right angular field of vision shall be used be used for determining pass or fail performance.~~

~~13.39.7.4~~

~~Evidence of liquid on the liquid-absorptive garment inside the specimen shall constitute failing performance.~~

~~13.39.8~~ ~~Specific Requirements for Testing Single-Use Garments or Single-Use Ensembles.~~

~~Single-use garments and ensemble samples shall be conditioned as specified in 13.1.2 .~~

~~**13.39.9** Specific Requirements for Testing Multiple-Use Garments or Multiple-Use Ensembles.~~

~~Multiple-use garments and the garment elements of the ensemble samples shall be conditioned as specified in 13.1.3 and then conditioned as specified in 13.1.2 . All other ensemble elements that are not attached to the garment element shall be conditioned as specified in 13.1.2 .~~

~~**13.40** Visor Drop Ball Impact Resistance Test.~~

~~**13.40.1** Application.~~

~~**13.40.1.1**~~

~~This test shall apply to visor materials.~~

~~**13.40.1.2**~~

~~Where the visor is constructed of several layers, then all layers, assembled in the order in which they appear in the suit, shall be tested as a composite.~~

~~**13.40.2** Sample Preparation.~~

~~**13.40.2.1**~~

~~Samples shall be at least 2 m^2 (2 yd^2) of material.~~

~~**13.40.2.2**~~

~~Samples shall be conditioned as specified in 13.1.2 .~~

~~**13.40.3** Specimens.~~

~~**13.40.3.1**~~

~~Specimens shall be 450 mm × 305 mm.~~

~~**13.40.3.2**~~

~~A minimum of five specimens shall be tested.~~

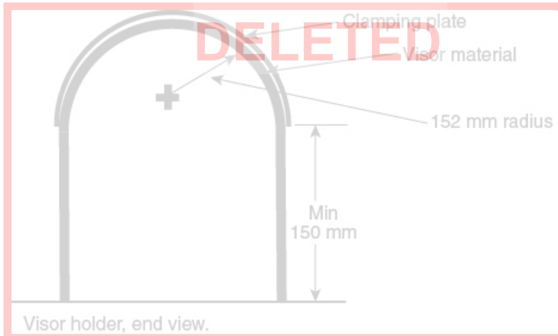
~~**13.40.4** Procedure.~~

~~Specimens shall be tested in accordance with Section 9.6 of ANSI Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices,* with the following modifications:~~

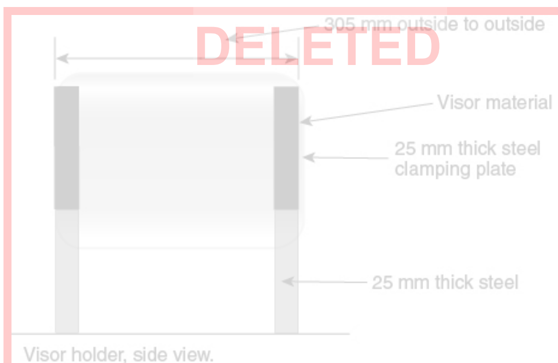
~~13.40.4.1~~

~~Visor material shall be securely mounted to test fixture shown in Figure 13.40.4.1(a) and Figure 13.40.4.1(b) .~~

~~Figure 13.40.4.1(a) Fixtures for Positioning Visor Material for Impact Resistance Testing.~~



~~Figure 13.40.4.1(b) Fixtures for Positioning Visor Material for Impact Resistance Testing.~~



~~13.40.4.2~~

~~Sample number shall be as indicated above.~~

~~13.40.4.3~~

~~Impact location shall be in the center of the visor.~~

~~13.40.5~~ ~~Report.~~

~~Visible penetration or full thickness cracks shall be recorded and reported.~~

~~13.40.6~~ ~~Interpretation.~~

~~Penetration or full thickness cracking on any single impact shall be used to determine compliance.~~

~~13.41~~ ~~Evaporative Resistance Test.~~

~~13.41.1~~ ~~Application.~~

~~This test method shall apply to protective garment composites.~~

~~13.41.2~~ ~~Samples.~~

~~13.41.2.1~~

~~Samples shall be conditioned at a temperature of 25°C ± 7°C (77°F ± 13°F), and a relative humidity of 65 percent ± 5 percent, for at least 4 hours.~~

~~13.41.2.2~~

~~The minimum sample size shall be 51 cm × 51 cm (20 in. × 20 in.).~~

~~13.41.3~~ ~~Specimens.~~

~~**13.41.3.1**~~

~~Evaporative resistance testing shall be conducted on at least three specimens.~~

~~**13.41.3.2**~~

~~Specimens shall consist of all layers in the emergency medical protective garment composite, arranged in the order and orientation as worn.~~

~~**13.41.4** Apparatus.~~

~~**13.41.4.1**~~

~~The test apparatus shall be as specified in ISO 11092, *Textiles — Physiological effects — Measurement of thermal and water-vapor resistance under steady-state conditions (sweating guarded-hotplate test)* .~~

~~**13.41.4.2**~~

~~The dimensions for the sweating guarded hot plate shall be a 25.4 cm (10 in.) test plate with a 12.7 cm (5 in.) guard surrounding the test plate.~~

~~**13.41.5** Procedure.~~

~~Testing shall be conducted in accordance with ISO 11092, *Textiles — Physiological effects — Measurement of thermal and water-vapor resistance under steady-state conditions (sweating guarded-hotplate test)* , with the following modifications:~~

~~The specimen shall be placed on the test plate with the side normally facing the human body toward the test plate.~~

~~For multiple layers the layers shall be arranged in the order and orientation as worn.~~

~~Each layer shall be smoothed by hand to eliminate wrinkles or bubbles in each layer and, if necessary, secure the edges.~~

~~Once the test is started, no further adjustments to the specimen shall be made.~~

~~**13.41.6** Report.~~

~~**13.41.6.1**~~

~~The total evaporative resistance (R_{et}) of each sample shall be recorded and reported.~~

~~**13.41.6.2**~~

~~The average total evaporative resistance (R_{et}) of all tested samples shall be recorded and reported.~~

~~**13.41.7** Interpretation.~~

~~**13.41.7.1**~~

~~Pass or fail determination shall be based on the average reported total evaporative resistance (R_{et}) measurement of all specimens tested.~~

~~**13.41.7.2**~~

~~If an individual result from any test set varies more than ± 10 percent from the average result, the results from the test set shall be discarded and another set of specimens shall be tested.~~

Submitter Information Verification

Committee: FAE-EMS
Submittal Date: Mon Nov 09 11:18:58 EST 2020

Committee Statement

Committee Statement: The NFPA Standards Council approved the technical committee's request to remove NFPA 1999 from the consolidated NFPA 1990 document. This section is being removed as it pertains specifically to NFPA 1999.

Response Message: SR-101-NFPA 1990-2020

Public Comment No. 14-NFPA 1990-2020 [Chapter 13]

Public Comment No. 249-NFPA 1990-2020 [Sections A.13.1.8, A.13.2.4.1, A.13.2.5.2, A.13.2.6, A.13.9...]

Ballot Results

✔ **This item has passed ballot**

17 Eligible Voters
6 Not Returned
11 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Area, James B.

Billings, Lincoln

Bogucki, Sandy

Davis, James E.

Davis, Todd P.

Patrick, Richard W.

Affirmative All

Fithian, William A.

Freeman, Patricia A.

Hickerson, Barry L.

Horowitz, Jason

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Newsom, Amanda H.

Sadtler, Jeff

Stull, Jeffrey O.

M E M O R A N D U M

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, *Committee Administrator*

DATE: February 22, 2021

SUBJECT: NFPA 1990 Second Draft Technical Committee FINAL Ballot Results (CustA2021)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

33 **Members Eligible to Vote**
5 **Members Not Returned** (*Allen, Del Re, D. Green, R. Greene, Thompson*)

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 133-NFPA 1990-2020 [Global Comment]

Replace "respiratory equipment" with "respirator" or "respirators" as appropriate to the specific paragraph.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:09:04 EST 2020

Committee Statement

Committee Statement: The principal term respirator is being retained with the removal of respiratory equipment.
Response Message: SR-133-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 143-NFPA 1990-2020 [Global Comment]

Change all instances of "suit" to "garment" throughout the document.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 11:07:22 EST 2020

Committee Statement

Committee Statement: Change for consistency of language throughout document.
Response Message: SR-143-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

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O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 167-NFPA 1990-2020 [Global Comment]

See attached for legislative changes to ch.1, including annex material

Supplemental Information

File Name	Description	Approved
1990_SR_167_ch._1.docx	For staff use	
1990_SR_167_ch._1.to_ballot.pdf	To ballot	

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 17 11:25:41 EST 2020

Committee Statement

Committee Statement: With the removal of NFPA 1999 from this document, the scope, purpose, and application were moved from chapter 4 to chapter 1. Chapter 4 has been reorganized with the relocation of the scope, purpose, and application. In both chapters, terminology has been revised for consistency and clarity and references have been corrected based on the revision.

Response Message: SR-167-NFPA 1990-2020

Public Comment No. 108-NFPA 1990-2020 [Section No. A.4.4.1.4]

Public Comment No. 104-NFPA 1990-2020 [Section No. A.4.2.1.5]

Public Comment No. 86-NFPA 1990-2020 [Section No. 4.3.1.9]

Public Comment No. 2-NFPA 1990-2020 [Chapter 1]

Public Comment No. 70-NFPA 1990-2020 [New Section after 4.1.1]

Public Comment No. 91-NFPA 1990-2020 [Section No. 4.4.1.5]

Public Comment No. 95-NFPA 1990-2020 [Section No. 4.4.1.8]

Public Comment No. 105-NFPA 1990-2020 [Section No. A.4.3.1.5]

Public Comment No. 85-NFPA 1990-2020 [Section No. 4.3.1.8]

Public Comment No. 94-NFPA 1990-2020 [Section No. 4.4.1.1]

Public Comment No. 93-NFPA 1990-2020 [Section No. 4.4.1.7]

Public Comment No. 100-NFPA 1990-2020 [Section No. 4.2.1.4]

Public Comment No. 92-NFPA 1990-2020 [Section No. 4.4.1.6]

Public Comment No. 80-NFPA 1990-2020 [Section No. 4.3.1.4]

Public Comment No. 98-NFPA 1990-2020 [Section No. 4.2.1.2]

Public Comment No. 90-NFPA 1990-2020 [Section No. 4.4.1.4]

Public Comment No. 294-NFPA 1990-2020 [Section No. A.4.4.1.1]

Public Comment No. 102-NFPA 1990-2020 [Section No. 4.2.1.6]

Public Comment No. 117-NFPA 1990-2020 [Section No. 4.3.3.3]
Public Comment No. 111-NFPA 1990-2020 [New Section after 4.1.3]
Public Comment No. 76-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 259-NFPA 1990-2020 [Section No. 4.3.2.2]
Public Comment No. 127-NFPA 1990-2020 [Section No. 4.4.3.7]
Public Comment No. 83-NFPA 1990-2020 [Section No. 4.3.1.6]
Public Comment No. 84-NFPA 1990-2020 [Section No. 4.3.1.7]
Public Comment No. 73-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 82-NFPA 1990-2020 [Section No. 4.3.1.2]
Public Comment No. 96-NFPA 1990-2020 [Section No. 4.4.1.9]
Public Comment No. 71-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 89-NFPA 1990-2020 [Section No. 4.4.1.3]
Public Comment No. 101-NFPA 1990-2020 [Section No. 4.2.1.5]
Public Comment No. 118-NFPA 1990-2020 [Section No. 4.3.3.4]
Public Comment No. 124-NFPA 1990-2020 [Section No. 4.3.3.6]
Public Comment No. 114-NFPA 1990-2020 [Section No. 4.2.3.1]
Public Comment No. 75-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 109-NFPA 1990-2020 [Section No. A.4.4.1.6]
Public Comment No. 106-NFPA 1990-2020 [Section No. A.4.3.1.6]
Public Comment No. 172-NFPA 1990-2020 [Section No. 4.3.1.1]
Public Comment No. 81-NFPA 1990-2020 [Section No. 4.3.1.5]
Public Comment No. 74-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 115-NFPA 1990-2020 [Section No. 4.2.3.2]
Public Comment No. 99-NFPA 1990-2020 [Section No. 4.2.1.3]
Public Comment No. 72-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 250-NFPA 1990-2020 [Section No. 4.4.2.3]
Public Comment No. 112-NFPA 1990-2020 [New Section after 4.1.3]
Public Comment No. 113-NFPA 1990-2020 [New Section after 4.1.3]
Public Comment No. 125-NFPA 1990-2020 [Section No. 4.4.3.5]
Public Comment No. 126-NFPA 1990-2020 [Section No. 4.4.3.6]
Public Comment No. 77-NFPA 1990-2020 [New Section after 4.1.1]
Public Comment No. 116-NFPA 1990-2020 [Section No. 4.3.3.2]
Public Comment No. 103-NFPA 1990-2020 [Section No. 4.3.1.3]
Public Comment No. 292-NFPA 1990-2020 [Section No. A.4.3.1.3]
Public Comment No. 120-NFPA 1990-2020 [Section No. 4.3.3.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 57-NFPA 1990-2020 [Global Comment]

Change title of 8.5.11.1 to Cold temperature Bend Test One (remove word "performance")

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 10:12:10 EDT 2020

Committee Statement

Committee Statement:	The committee decided to retain the existing cold temperature performance test and correct the test method title.
Response Message:	SR-57-NFPA 1990-2020

Public Comment No. 304-NFPA 1990-2020 [Section No. 8.5.11.1]

Public Comment No. 308-NFPA 1990-2020 [Section No. 8.5.11.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 142-NFPA 1990-2020 [Global Input]

Change Document Title to:

~~Standards~~ Standard for Protective Ensembles for Hazardous ~~Material~~ Materials and CBRN Operations

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 10:55:33 EST 2020

Committee Statement

Committee Statement: NFPA 1999 was removed so the title was adjusted to reflect hazmat and CBRN operations.

Response Message: SR-142-NFPA 1990-2020

Public Comment No. 1-NFPA 1990-2020 [Global Input]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

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Kilinc-Balci, F. Selcen

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Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 169-NFPA 1990-2021 [Detail]

~~3.3.5 Arch.~~

~~The bottom curve of the foot from the heel to the ball.~~

3.3.6.1 ~~Garment~~ Closure Assembly. [Move to 3.3.15]

The combination of the suit or garment closure and the seam attaching the suit or garment closure to the suit or garment, including any protective flap or cover.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Fri Jan 29 12:43:50 EST 2021

Committee Statement

Committee Statement: The term arch is not used in the standard and was removed. Closure assembly is most consistently used instead of suit or garment closure assembly. Closure assembly should become a new separation definition.

Response Message: SR-169-NFPA 1990-2021

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 92-NFPA 1990-2020 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, ~~2017~~ 2022 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

~~NFPA 1581 , *Standard on Fire Department Infection Control Program* , 2015 edition.~~

NFPA 1891 , *Standard on Selection, Care, and Maintenance of Hazardous Materials Clothing and Equipment* , 2022 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2020 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1977 , *Standard on Protective Clothing and Equipment for Wildland Fire Fighting* , 2022 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2019 edition.

NFPA 1986, *Standard on Respiratory Protection Equipment for Tactical and Technical Operations*, 2017 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2016 edition.

NFPA 1992, *Standard on Liquid Splash–Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2018 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2018 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations*, 2018 edition.

2.3 Other Publications.

2.3.1 AATCC Publications.

American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

~~AATCC 42, *Test Method for Water Resistance: Impact Penetration* , 2017e.~~

~~AATCC 61, *Test Method for Colorfastness to Laundering: Accelerated* , 2013.~~

~~AATCC 70, *Test Method for Water Repellency: Tumble Jar Dynamic Absorption,* 2015e2.~~

~~AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics* , 2004.~~

AATCC Evaluation Procedure 6, *Instrumental Color Measurement*, 2016.

2.3.2 ANSI Publications.

American National Standards Institute, Inc., 25 West 43rd Street, 4th floor, New York, NY 10036.

~~ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories,* 2015.~~

ANSI/ISEA Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*, ~~2015~~ 2020 .

ANSI/ISEA Z89.1, *American National Standard for Industrial Head Protection*, 2014 (R2019) .

2.3.3 ASTM Publications.

~~American Society for Testing and Materials, 100 Barr Harbor Drive~~ ASTM International, 100 Barr Harbor Drive, P.O. Box C700 , West Conshohocken, PA 19428-2959.

~~ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus* , 2019.~~

ASTM D412, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers — Tension,* 2016.

ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids,* 2016a.

~~ASTM D573, *Standard Test Method for Rubber — Deterioration in an Air Oven,* 2004, reapproved 2019.~~

ASTM D747, *Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam*, 2010, withdrawn .

ASTM D751, *Standard Test Methods for Coated Fabrics*, 2019.

~~ASTM D1230, *Standard Test Method for Flammability of Apparel Textiles* , 2017.~~

~~ASTM D1683/D1683M, *Standard Test Method for Failure in Sewn Seams of Woven Fabrics,* 2017, reapproved 2018.~~

ASTM D1776/D1776M, *Standard Practice for Conditioning and Testing Textiles*, ~~2016~~ 2020 .

ASTM D2136, *Standard Test Method for Coated Fabrics — Low-Temperature Bend Test*, 2019.

ASTM D2582, *Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting,* 2016.

~~ASTM D3787, *Method for Bursting Strength of Textiles — Constant-Rate-of-Traverse (CRT) Ball Burst Test,* 2016.~~

ASTM D3884, *Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)*, 2009, reapproved 2017.

ASTM D4157, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)*, 2013, reapproved 2017.

~~ASTM D4966, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method),* 2012, reapproved 2016.~~

~~ASTM D5034, *Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)* , 2009, reapproved 2017.~~

ASTM D5151, *Standard Test Method for Detection of Holes in Medical Gloves*, 2019.

~~ASTM D5169, *Standard Test Method for Shear Strength (Dynamic Method) of Hook and Loop Touch Fasteners* , 1998, reapproved 2015.~~

~~ASTM D5170, *Standard Test Method for Peel Strength ("T" Method) of Hook and Loop Touch Fasteners* , 1998, reapproved 2015.~~

~~ASTM D5587, *Standard Test Method for Tearing Strength of Fabrics by Trapezoid Procedure* , 2015, reapproved 2019.~~

~~ASTM D5712, *Standard Test Method for Analysis of Aqueous Extractable Protein in Latex, Natural Rubber, and Elastomeric Products Using the Modified Lowry Method,* 2015.~~

ASTM D6413/D6413M, *Standard Test Method for Flame Resistance of Textiles (Vertical Test)*, 2015.

~~ASTM D6988, *Standard Guide for Determination of Thickness of Plastic Film Test Specimens* , 2013.~~

~~ASTM E96/E96M, *Standard Test Methods for Water Vapor Transmission of Materials,* 2016.~~

~~ASTM E809, *Standard Practice for Measuring Photometric Characteristics of Retroreflectors,* 2008, reproved 2013.~~

ASTM F392/F392M, *Standard Practice for Conditioning Flexible Barrier Materials for Flex Durability*, 2011, reapproved 2015.

ASTM F739, *Standard Test Method for Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Continuous Contact*, 2012e1.

ASTM F903, *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids*, 2018.

ASTM F1001, *Standard Guide for Selection of Chemicals to Evaluate Protective Clothing Materials*, 2012, reaffirmed 2017.

ASTM F1052, *Standard Test Method for Pressure Testing Vapor Protective Suits*, 2014.

ASTM F1154, *Standard Practices for Evaluating the Comfort, Fit, Function, and Durability of Protective Ensembles, Ensemble Elements, and Other Components*, 2018.

ASTM F1301, *Standard Practice for Labeling Chemical Protective Clothing*, 2018.

ASTM F1342/F1342M, *Standard Test Method for Protective Clothing Material Resistance to Puncture,* 2005, reapproved 2013e1.

ASTM F1358, *Standard Test Method for Effects of Flame Impingement on Materials Used in Protective Clothing not Designated Primarily for Flame Resistance*, 2016.

ASTM F1359/F1359M, *Standard Test Method for Liquid Penetration Resistance of Protective Clothing or Protective Ensembles Under a Shower Spray While on a Manikin*, 2016a.

ASTM F1671~~/F1671M~~ , *Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage Penetration as a Test System*, 2013.

ASTM F1790, *Standard Test Method for Measuring Cut Resistance of Materials Used in Protective Clothing*, 2005.

~~ASTM F1862/F1862M, *Standard Test Method for Resistance of Medical Face Masks to Penetration by Synthetic Blood (Horizontal Projection of Fixed Volume at a Known Velocity),* 2017.~~

ASTM F1868, *Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate*, 2017.

ASTM F1930, *Standard Test Method for Evaluation of Flame-Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin,* 2018.

ASTM F2010/F2010M, *Standard Test Method for Evaluation of Glove Effects on Wearer Finger Dexterity Using a Modified Pegboard Test*, 2018.

~~ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks* , 2019.~~

ASTM F2412, *Standard Test Methods for Foot Protection*, 2018a.

ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*, 2018.

ASTM F2700, *Standard Test Method for Unsteady-State Heat Transfer Evaluation of Flame Resistant Materials for Clothing with Continuous Heating*, 2008, reapproved 2013.

ASTM F2913, *Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester*, 2019.

~~ASTM F2961, *Standard Test Method for Characterizing Gripping Performance of Gloves Using a Torque Meter* , 2015.~~

~~**2.3.4** CENELEC Publications.~~

~~CENELEC, European Committee for Electrotechnical Standardization, CEN-CENELEC Management Centre, Avenue Marnix 17, 4th floor, B-1000 Brussels, Belgium.~~

~~EN 420, *Protective Gloves — General requirements and test methods* , 2003 + A1: 2010.~~

~~EN 455-2, *Medical gloves for single use — Part 2: Requirements and testing for physical properties* , 2015.~~

2.3.4 FIA Publications.

Footwear Industries of America, 1420 K Street, NW, Suite 600, Washington, DC 20005.

FIA Standard 1209, *Whole Shoe Flex*, 1984.

2.3.5 IEC Publications.

International Electrotechnical Commission, 3, rue de Varembé, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

IEC 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications*, 2013.

2.3.6 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, 1983, confirmed 2014.

~~ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection* , 1999, amendment 1, 2011.~~

ISO 4649, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*, 2017.

ISO 6530, *Protective clothing — Protection against liquid chemicals — Test method for resistance of materials to penetration by liquids*, 2005.

~~ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing* , 1995, confirmed 2015.~~

~~ISO 9001, *Quality management systems — Requirements* , 2008.~~

ISO 9001, *Quality management systems — Requirements,* 2015.

ISO 11092, *Textiles — Physiological effects — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)*, 2014.

~~ISO 13287, *Personal protective equipment — Footwear — Test method for slip resistance* , 2019.~~

ISO/IEC 17011, *Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*, 2004.

ISO/IEC 17021, *Conformity assessment — Requirements for bodies providing audit and certification of management systems* , 2015.

ISO/IEC 17025*, General requirements for the competence of testing and calibration laboratories*, 2017.

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes, and services,* 2012.

2.3.7 NIOSH Publications.

National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, GA ~~30333~~ 30329-4027 .

Statement of Standard for NIOSH CBRN APR Testing, 2003.

Statement of Standard for NIOSH CBRN PAPR Testing, 2006.

Statement of Standard for NIOSH CBRN SCBA Testing, 2003.

~~**2.3.9** Psychological Corporation Publications.~~

~~Psychological Corporation, 555 Academic Court, San Antonio, TX 78204.~~

~~“Crawford Small Parts Dexterity Test,” 1981.~~

2.3.8 US Government Publications.

US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Federal Test Method Standard 191A, *Textile Test Methods*, 1978.

Title 18, United States Code, Part 2332a, "Use of Weapons of Mass Destruction."

Title 29, Code of Federal Regulations, Part 1910.132, "Personal Protective Equipment: General Requirements."

~~Title 29, Code of Federal Regulations, Part 1910.132, "Personal Protective Equipment: General Requirements."~~

~~Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection."~~

~~Title 29, Code of Federal Regulations, Part 1910.1030, "Bloodborne Pathogens."~~

~~Title 42, Code of Federal Regulations, Part 84, "Approval of Respiratory Protective Devices."~~

~~**2.3.11** Department of Defense Publications.~~

~~Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.~~

~~A-A-55126B, *Commercial Item Description: Fastener Tapes, Hook and Loop, Synthetic*, 2006.~~

~~A-A-55634B, *Commercial Item Description: Zippers (Fasteners, Slide Interlocking)*, 2018.~~

2.3.9 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

~~Assessment of the US Army Chemical And Biological Defense Command Report 1:~~ Technical Assessment of the Man-In-Simulant Test ~~(MIST)~~ Program, National Research Council Report, The National Academies, 500 Fifth St. NW, Washington, DC 20001, 1997.

The Technical Cooperation Program, Chemical Biological Defense Technical Panel 11 on Low Burden, Integrated Protective Clothing, "Final Report: Development of a Standard Vapour Systems Test to Assess the Protection Capability of NBC Individual Protective Ensembles," Appendix G, Defence Research Establishment Suffield Report, Biological and Chemical Defence Review Committee, Suite 405 2-2026, Lanthier Drive, Ottawa, ON, K4N 0N6, April 1997, UNCLASSIFIED.

2.3.10 US Military Publications.

US Army Developmental Test Command (DTC), Technology Management Division (CSTE-DTC-TT-M), 314 Longs Corner Road, Aberdeen Proving Ground, MD 21005-5055.

Test Operations Procedure (TOP) 08-2-503, *Low Volatility Agent Permeation (LVAP) Swatch Testing*, 2018.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 09:03:02 EST 2020

Committee Statement

Committee Statement: Update of referenced publications related to revisions of NFPA 1990. The deletion of references is to remove those associated with NFPA 1999 content. Updates of references is to reflect revised editions of referenced publications.

Response Message: SR-92-NFPA 1990-2020

Public Comment No. 3-NFPA 1990-2020 [Global Input]

Public Comment No. 16-NFPA 1990-2020 [Chapter 2]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Kilinc-Balci, F. Selcen

I suggest deleting the "Testing" wording from the NIOSH standards so that it reads: Statement of Standard for NIOSH CBRN Full Facepiece APR, 2003 Statement of Standard for NIOSH CBRN PAPR, 2006 Statement of Standard for NIOSH CBRN SCBA, 2003 Statement of the Standards also has labeling and quality assurance, etc. in addition to testing.

Second Revision No. 108-NFPA 1990-2020 [Sections 3.3.7, 3.3.8, 3.3.9, 3.3.10, 3.3.11, 3.3.12]

3.3.6 Barrier Layer.

The layer of garment material, glove material, footwear material, or ~~face protection device~~ hood material designated as ~~providing body fluid-borne pathogen resistance~~ primarily contributing to element integrity and chemical/barrier performance .

~~**3.3.8** Biological Agents.~~

~~Biological materials that are capable of causing disease or long-term damage to the human body.~~

~~**3.3.9** Biological Terrorism Agents.~~

~~See 3.3.4.1 .~~

~~**3.3.10** Bloodborne Pathogens.~~

~~Microorganisms and other potentially infectious material (OPIM) present in blood that can cause diseases in humans.~~

~~**3.3.11** Body Fluids.~~

~~Fluids that are produced by the body, including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluid, cerebrospinal fluid, synovial fluid, sweat, vomit, and pericardial fluid.~~

~~**3.3.12** Body Fluid–Borne Pathogen.~~

~~An infectious bacterium or virus carried in human, animal, or clinical body fluids organs, or tissue.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:05:55 EST 2020

Committee Statement

Committee Statement: The barrier layer definition was updated based on the consolidated standard and other terms no longer used in the standard were removed. Biological terrorism agents is already defined.

Response Message: SR-108-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 5-NFPA 1990-2020 [Section No. 3.3.14]

~~**3.3.14** Brim.~~

~~A part of the shell of the helmet that extends around the entire circumference of the helmet.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:46:53 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-5-NFPA 1990-2020

Public Comment No. 214-NFPA 1990-2020 [Section No. 3.3.14]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 109-NFPA 1990-2020 [Section No. 3.3.17]

~~**3.3.17** CBRN Barrier Material.~~

~~The part of the composite that is intended to provide protection against CBRN terrorism agents.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:07:51 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-109-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 20-NFPA 1990-2020 [Section No. 3.3.18]

~~**3.3.18** CBRN Terrorism Agents.~~

~~See 3.3.4.2 .~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:59:06 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.
Response Message: SR-20-NFPA 1990-2020

Public Comment No. 18-NFPA 1990-2020 [Section No. 3.3.18]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 110-NFPA 1990-2020 [Section No. 3.3.21]

3.3.10 ~~Chemical and Biological~~ CBRN Terrorism Incidents.

Situations involving the intentional or accidental release of ~~chemical or biological~~ CBRN warfare agents in civilian areas ~~by terrorists~~ .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:08:30 EST 2020

Committee Statement

Committee Statement: The term was modified for consistency with the scope of the standard.
Response Message: SR-110-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 111-NFPA 1990-2020 [Section No. 3.3.24]

~~**3.3.24** Chemical-Protective Material.~~

~~Any material or composite used to provide protection from chemical hazards; can be a part of the primary garment material.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:13:18 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-111-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 21-NFPA 1990-2020 [Sections 3.3.25, 3.3.26]

~~**3.3.25** Chemical Terrorism Agents.~~

~~See 3.3.4.3 .~~

~~**3.3.26** Chemical Warfare (CW) Agents.~~

~~See 3.3.4.4 .~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:59:44 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.
Response Message: SR-21-NFPA 1990-2020

Public Comment No. 19-NFPA 1990-2020 [Sections 3.3.25, 3.3.26]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 6-NFPA 1990-2020 [Section No. 3.3.27]

~~**3.3.27** Combined Performance Material.~~

~~A retroreflective material that is also a fluorescent material.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:48:52 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-6-NFPA 1990-2020

Public Comment No. 176-NFPA 1990-2020 [Section No. 3.3.27]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 112-NFPA 1990-2020 [Section No. 3.3.33]

~~**3.3.33** Cracking Pressure.~~

~~The pressure at which the suit exhaust valve begins to open, releasing exhaust air to the outside suit environment.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:13:45 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-112-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 7-NFPA 1990-2020 [Section No. 3.3.34]

~~**3.3.34** Crown.~~

~~The portion of the helmet that covers the head above the reference plane.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:49:38 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-7-NFPA 1990-2020

Public Comment No. 215-NFPA 1990-2020 [Section No. 3.3.34]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 8-NFPA 1990-2020 [Section No. 3.3.35]

~~**3.3.35** Crown Straps.~~

~~The part of the helmet suspension that passes over the head.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:50:34 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-8-NFPA 1990-2020

Public Comment No. 216-NFPA 1990-2020 [Section No. 3.3.35]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 113-NFPA 1990-2020 [Section No. 3.3.41]

~~**3.3.41** Emergency First Responder Personnel.~~

~~Those persons, including members of fire departments, police departments, other law enforcement agencies, hazardous materials response teams, emergency medical services, and other organizations who have public safety responsibilities and who would respond to rescue and treat victims, and who would protect the public during an emergency incident.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:14:23 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-113-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 9-NFPA 1990-2020 [Section No. 3.3.42]

~~**3.3.42*** Emergency Medical Cleaning/Utility Glove.~~

~~Multipurpose glove that provides a barrier against body fluids, cleaning fluids, and disinfectants and limited physical protection to the wearer.~~

~~**A.3.3.42** Emergency Medical Cleaning/Utility Glove.~~

~~Emergency medical cleaning/utility gloves are moderately thick rubber gloves and have limited application for emergency patient care because these gloves might not provide adequate hand function in terms of dexterity and tactility for some medical tasks, such as palpitation of a pulse or setting an IV. However, emergency medical cleaning/utility gloves are more robust and provide greater resistance to physical hazards compared to emergency medical examination gloves and can be suitable for body recovery and other medical functions where blood and other body fluids could be encountered outside the provision of emergency patient care.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:51:11 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-9-NFPA 1990-2020

Public Comment No. 178-NFPA 1990-2020 [Section No. 3.3.42]

Public Comment No. 225-NFPA 1990-2020 [Section No. A.3.3.42]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 10-NFPA 1990-2020 [Section No. 3.3.43]

~~**3.3.43** Emergency Medical Examination Glove.~~

~~An element or item of emergency medical protective ensemble or protective clothing that is designed and configured to provide barrier protection to the wearer's hand to at least the wrist. *(See 3.3.56 , Emergency Medical Work Glove.)*~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:53:08 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-10-NFPA 1990-2020

Public Comment No. 179-NFPA 1990-2020 [Section No. 3.3.43]

Public Comment No. 4-NFPA 1990-2020 [Global Input]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 11-NFPA 1990-2020 [Sections 3.3.44, 3.3.45, 3.3.46, 3.3.47, 3.3.48, 3.3.49, 3....]

~~**3.3.44*** Emergency Medical Eye and Face Protection Device.~~

~~An item of emergency medical protective clothing that is designed and configured to provide barrier protection to the wearer's eyes, face, or both eyes and face.~~

~~**A.3.3.44** Emergency Medical Eye and Face Protection Device.~~

~~These devices include spectacles, goggles, faceshields, and combination devices, but do not include emergency medical face masks, which are separately defined and to which different criteria are applied. These devices differ from emergency medical facemasks by being continuous in their barrier protection to the eyes or portions of the face that are protected. These devices further provide physical protection to the eyes and portions of the face.~~

~~**3.3.45*** Emergency Medical Facemask.~~

~~An item of emergency medical protective clothing that is designed and configured to provide protection to the wearer's face including the mucous membrane area of the wearer's nose and mouth.~~

~~**A.3.3.45** Emergency Medical Facemask.~~

~~Emergency medical facemasks include surgical and procedure masks, which might or might not have shields. These items of protective clothing include materials that are resistant to the penetration of blood and body fluids while allowing the wearer to breathe through the facemask material.~~ NFPA 1999 ~~references that emergency medical facemasks comply with the "high barrier performance" of requirements of ASTM F2100,~~ ~~*Standard Specification for Performance of Materials Used in Medical Face Masks*~~ ~~. Nevertheless, these items do not afford the same level of barrier protection consistent with other items of emergency medical protective clothing since they are not tested for and cannot pass viral penetration resistance testing.~~

~~Emergency medical facemasks, unless certified by NIOSH under 42 CFR 84, "Approval of Respiratory Protective Devices," are not respirators and do not provide respiratory protection against airborne hazards.~~

~~**3.3.46** Emergency Medical Footwear.~~

~~An element or item of emergency medical protective ensemble or protective clothing that is designed and configured to provide barrier protection to the wearer's feet.~~

~~**3.3.47** Emergency Medical Footwear Cover.~~

~~An element or item of emergency medical protective ensemble or protective clothing designed and configured to be worn over standard footwear to provide barrier and limited physical protection to the wearer's feet.~~

~~**3.3.48*** Emergency Medical Garment.~~

~~An element or item of emergency medical protective ensemble or protective clothing designed and configured as a single garment or an assembly of multiple garments to provide barrier protection to the wearer's upper and lower torso, excluding the hands, face, and feet.~~

~~**A.3.3.48** Emergency Medical Garment.~~

~~Emergency medical garments include, but are not limited to, full body clothing such as suits, coveralls, and patient/victim isolation bags; and non-full body clothing such as aprons, hoods, and sleeve protectors.~~

~~**3.3.49** Emergency Medical Helmet.~~

~~An item of emergency medical protective clothing designed and configured to provide protection to the wearer's head.~~

~~**3.3.50*** Emergency Medical Operations.~~

~~Provision of emergency patient care and transportation prior to arrival at a medical care facility by emergency medical responders, emergency patient care by medical first receivers at a medical care facility, and body recovery by emergency medical responders.~~

~~**A.3.3.50** Emergency Medical Operations.~~

~~Emergency medical operations include the provision of emergency patient care by emergency medical responders and medical first receivers. For emergency medical responders, this care might be provided at the scene of accident or in the transport of patients to a medical facility. For medical first receivers, care is generally provided at a medical facility, although medical first receivers might also provide emergency patient care at various temporary emergency medical facilities. Body recovery is included as emergency medical operations because some patients could die in the course of treatment, and some events, including large-scale disasters, could require body removal, in which significant blood-borne pathogen hazards exist.~~

~~**3.3.51*** Emergency Medical Powered Air-Purifying Respirator (PAPR).~~

~~An element or item of an emergency medical protective ensemble designed and configured to provide respiratory protection to the wearer from airborne infectious diseases, to act as a barrier, and to provide limited physical protection to the wearer's head and neck.~~

~~**A.3.3.51** Emergency Medical Powered Air-Purifying Respirator (PAPR).~~

~~For the purpose of this standard, an emergency medical powered air-purifying respirator (PAPR) is a device that is approved by the National Institute for Occupational Safety and Health (NIOSH) according to 42 CFR 84, "Approval of Respirator Protective Devices," and, when a hood is used in the design of the PAPR, meets the applicable separate requirements for garment materials.~~

~~**3.3.52*** Emergency Medical Protective Clothing.~~

~~Items of both single-use and multiple-use protective clothing that provide limited physical protection and barrier protection against body fluid-borne pathogen contact with the wearer's body during delivery of emergency patient care and other emergency medical functions.~~ ~~*(See 3.3.42 , Emergency Medical Cleaning/Utility Glove; 3.3.43 , Emergency Medical Examination Glove; 3.3.44 , Emergency Medical Eye and Face Protection Device; 3.3.45 , Emergency Medical Facemask; 3.3.46 , Emergency Medical Footwear; 3.3.47 , Emergency Medical Footwear Cover; 3.3.48 , Emergency Medical Garment; 3.3.49 , Emergency Medical Helmet; and 3.3.56 , Emergency Medical Work Glove.)*~~

~~**A.3.3.52** Emergency Medical Protective Clothing.~~

~~Multiple items of protective clothing include single-use and multiple-use garments, single-use examination gloves, single-use cleaning/utility gloves, multiple-use work gloves, single-use footwear covers, multiple-use footwear, multiple-use medical care facility footwear, single-use facemasks, single-use and multiple-use eye and face protection devices, and multiple-use helmets.~~

~~**3.3.53** Emergency Medical Responders.~~

~~See 3.3.55.2 , Emergency Medical Responder.~~

~~**3.3.54** Emergency Medical Services (EMS).~~

~~A coordinated system providing the full spectrum of out-of-hospital patient services, including the provision of assessment, treatment, referrals, and transportation.~~

~~**3.3.55** Emergency Medical System Providers.~~

~~**3.3.55.1** Advanced Emergency Medical Technician (AEMT).~~

~~Provides out-of-hospital basic and limited advanced emergency medical care for patients who access the EMS system.~~

~~**3.3.55.2** Emergency Medical Responder.~~

~~Provides out-of-hospital immediate life-saving care to patients who access the EMS system.~~

~~**3.3.55.3** Emergency Medical Technician (EMT).~~

~~Provides out-of-hospital medical care and transportation for patients who access the EMS system.~~

~~**3.3.55.4** Paramedic.~~

~~Provides out-of-hospital advanced medical care for patients who access the EMS system.~~

~~**3.3.56** Emergency Medical Work Glove.~~

~~An element or item of emergency medical protective ensemble or protective clothing that is designed and configured to provide physical and barrier protection to the wearer's hand and wrist.~~ ~~*(See also 3.3.43 , Emergency Medical Examination Glove.)*~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 12:55:34 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-11-NFPA 1990-2020

Public Comment No. 180-NFPA 1990-2020 [Section No. 3.3.44]

Public Comment No. 181-NFPA 1990-2020 [Section No. 3.3.45]

Public Comment No. 189-NFPA 1990-2020 [Section No. 3.3.52]

Public Comment No. 183-NFPA 1990-2020 [Section No. 3.3.46]

Public Comment No. 187-NFPA 1990-2020 [Section No. 3.3.50]

Public Comment No. 184-NFPA 1990-2020 [Section No. 3.3.47]

Public Comment No. 193-NFPA 1990-2020 [Section No. 3.3.56]

Public Comment No. 191-NFPA 1990-2020 [Section No. 3.3.54]

[Public Comment No. 192-NFPA 1990-2020 [Section No. 3.3.55]]
[Public Comment No. 186-NFPA 1990-2020 [Section No. 3.3.49]]
[Public Comment No. 185-NFPA 1990-2020 [Section No. 3.3.48]]
[Public Comment No. 188-NFPA 1990-2020 [Section No. 3.3.51]]
[Public Comment No. 190-NFPA 1990-2020 [Section No. 3.3.53]]
[Public Comment No. 227-NFPA 1990-2020 [Section No. A.3.3.44]]
[Public Comment No. 228-NFPA 1990-2020 [Section No. A.3.3.45]]
[Public Comment No. 229-NFPA 1990-2020 [Section No. A.3.3.48]]
[Public Comment No. 230-NFPA 1990-2020 [Section No. A.3.3.50]]
[Public Comment No. 231-NFPA 1990-2020 [Section No. A.3.3.51]]
[Public Comment No. 232-NFPA 1990-2020 [Section No. A.3.3.52]]

Ballot Results

✔ This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 114-NFPA 1990-2020 [Section No. 3.3.57]

~~**3.3.57** Emergency Operations.~~

~~Activities of emergency responders relating to rescue, fire suppression, emergency medical care, and special operations.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 14:14:54 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-114-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 12-NFPA 1990-2020 [Section No. 3.3.58]

~~**3.3.58** Emergency Patient Care.~~

~~Treatment of patients by emergency medical responders or medical first receivers including first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other medical procedures that occur prior to arrival at a medical care facility, or after arrival at a medical care facility.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:03:11 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-12-NFPA 1990-2020

Public Comment No. 194-NFPA 1990-2020 [Section No. 3.3.58]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 115-NFPA 1990-2020 [Section No. 3.3.59]

3.3.26* Emergency ~~Response Personnel~~ Responders .

Personnel assigned to organizations that have the responsibility for responding to hazardous materials emergencies and CBRN terrorism incidents .

A.3.3.26 Emergency Responders.

Medical services providers, law enforcement officers, firefighters, volunteer firefighters or officers of a nonprofit volunteer fire company, emergency medical technicians, emergency nurses, ambulance operators, providers of civil defense services, and any other personnel who render mitigation, isolation, emergency care, or other forms of assistance at the scene of a hazardous materials emergency or CBRN terrorism incident, including post-event cleanup and recovery activities.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:27:30 EST 2020

Committee Statement

Committee Statement: The term was changed to reflect changes in the scope of the consolidated standard and an additional explanation was provided to include individuals other than first responders that may be engaged in related operations such as post emergency and incident clean-up.

Response Message: SR-115-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

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Newsom, Amanda H.

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O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 116-NFPA 1990-2020 [Section No. 3.3.60]

~~**3.3.60*** Encapsulating.~~

~~A type of ensemble that provides vapor- or gastight protection, or liquidtight protection, or both, and completely covers the wearer and the wearer's respiratory equipment.~~

~~**A.3.3.60** Encapsulating.~~

~~This standard does not cover requirements for vaportight protection.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:35:26 EST 2020

Committee Statement

Committee Statement: The term encapsulating ensemble was removed because it is redundant with encapsulating ensemble.
Response Message: SR-116-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
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Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 117-NFPA 1990-2020 [Sections 3.3.63, 3.3.64, 3.3.65, 3.3.66]

3.3.29 Ensembles.

~~Comprises multiple~~ Multiple ensemble elements that, when worn together, are designed to provide minimum full-body protection from some, but not all, risks occurring during hazardous materials emergencies and CBRN ~~emergency response~~ terrorism incidents. *(See also 3.3.28, Ensemble Elements).* .

3.3.29.1 NFPA 1991-Certified Ensembles and Ensemble Elements.

3.3.29.1.1* Vapor-Protective Ensemble.

Multiple elements of compliant protective clothing and equipment that, when worn together, provide protection from some, but not all, risks in vapor, liquid splash-protective, and particulate environments during hazardous materials emergencies and CBRN terrorism incidents in vapor, gas, liquid, or particulate forms.

A.3.3.29.1.1 Vapor-Protective Ensemble.

The vapor-protective ensemble elements are the garment, gloves, and footwear.

3.3.29.1.2 Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape and Liquefied Gas Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for both limited protection against chemical flash fire for escape only and for protection against liquefied gases.

3.3.29.1.3* Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for limited protection against chemical flash fire for escape only.

A.3.3.29.1.3 Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape Protection.

Ensembles meeting these requirements are intended to offer the wearer limited protection intended only to enable escape in situations that can result in chemical flash fires. This requirement does not imply any protection for any firefighting activities but offers minimum protection against the thermal effects of a chemical flash fire.

3.3.29.1.4* Vapor-Protective Ensemble with Optional Liquefied Gas Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for protection against liquefied gases.

A.3.3.29.1.4 Vapor-Protective Ensemble with Optional Liquefied Gas Protection.

Ensembles meeting these requirements are intended to offer the wearer limited protection against exposure to liquefied gases for a maximum exposure time of 15 minutes.

3.3.29.1.5* Vapor-Protective Footwear.

The ensemble element of the protective ensemble that provides chemical protection and physical protection to the feet, ankles, and lower legs.

A.3.3.29.1.5 Vapor-Protective Footwear.

Vapor-protective footwear includes boots or outer boots in conjunction with socks.

3.3.29.1.6 Vapor-Protective Gloves.

The ensemble element of the protective ensemble that provides chemical protection to the hands and wrists.

3.3.29.2 NFPA 1992-Certified Ensembles and Ensemble Elements.

3.3.29.2.1* Liquid Splash-Protective Ensemble.

Multiple elements of compliant protective clothing and equipment products that, when worn together, provide protection from some, but not all, risks of hazardous materials emergencies involving liquids to the torso, legs, arms, head, hands, and feet.

A.3.3.29.2.1 Liquid Splash-Protective Ensemble.

Liquid splash-protective ensemble elements include, but are not limited to, the garments, gloves, and footwear.

3.3.29.2.2* Liquid Splash-Protective Footwear.

The element of the protective ensemble or the item of protective clothing that provides liquid chemical protection and physical protection to the feet, ankles, and lower legs.

A.3.3.29.2.2 Liquid Splash-Protective Footwear.

Liquid splash-protective footwear includes boots or outer boots in conjunction with socks.

3.3.29.2.3* Liquid Splash-Protective Garment.

The element of the protective ensemble or the item of protective clothing that provides liquid chemical protection to the upper and lower torso, arms, and legs, but excluding the head, hands, and feet.

A.3.3.29.2.3 Liquid Splash-Protective Garment.

Liquid splash-protective garments include coveralls, multi-piece splash garments, encapsulating ensembles, and nonencapsulating ensembles.

3.3.29.2.4 Liquid Splash-Protective Glove.

The element of the protective ensemble or the item of protective clothing that provides liquid chemical protection to the hands and wrists.

3.3.29.2.5* Liquid Splash-Protective Hood.

The element of the protective ensemble or an item of protective clothing that provides liquid chemical protection and physical protection to the head and neck.

A.3.3.29.2.5 Liquid Splash-Protective Hood.

Hoods used for liquid splash protection during hazardous materials emergencies can have several different configurations that include, but are not limited to, the following:

(1) The hood can be a separate item of protective clothing that covers the head and neck of the wearer and includes a face opening for a respirator to provide complete head and neck protection.

(2) The hood can be a separate item of protective clothing that includes a visor, with a respirator worn under the hood.

(3) The hood can be a loose-fitting powered air-purifying respirator (PAPR) that includes a hood or other materials that enclose the wearer's head and neck while also providing respiratory protection. In this configuration, the PAPR is to be certified for respiratory protection by the National Institute for Occupational Safety and Health (NIOSH); however, the hood is addressed in this standard as a separate item of clothing or as an element of an ensemble and is subject to separate labeling, design, and performance requirements.

3.3.29.3 NFPA 1994-Certified Ensembles and Ensemble Elements.

3.3.29.3.1 Class 1 Hazmat/CBRN Protective Ensemble ~~(and Ensemble Elements)~~ .

An ensemble comprising ensemble elements that, when worn together, are designed to protect emergency ~~first~~ responders ~~personnel~~ at hazardous materials emergencies and CBRN terrorism incidents involving vapor or liquid chemical hazards where concentrations are at or above immediately dangerous to life and health (IDLH)~~,~~ levels, thus requiring the use of self-contained breathing apparatus (SCBA).

3.3.29.3.2 Class 2 Hazmat/CBRN Protective Ensemble ~~(and Ensemble Elements)~~ .

An ensemble comprising ensemble elements that, when worn together, are designed to protect emergency ~~first~~ responders ~~personnel~~ at hazardous materials emergencies and CBRN terrorism incidents involving vapor or liquid chemical hazards where concentrations are at or above ~~immediately dangerous to life and health (IDLH),~~ IDLH levels, thus requiring the use of self-contained breathing apparatus (SCBA).

3.3.29.3.3 Class 3 Hazmat/CBRN Protective Ensemble ~~(and Ensemble Elements)~~ .

An ensemble comprising ensemble elements that, when worn together, are designed to protect emergency ~~first~~ responders ~~personnel~~ at hazardous materials emergencies and CBRN terrorism incidents involving low levels of vapor or liquid chemical hazards where concentrations are below ~~immediately dangerous to life and health (IDLH),~~ IDLH levels, thus permitting the use of CBRN air-purifying respirators (APR) or CBRN-powered air-purifying respirators (PAPR).

3.3.29.3.4 Class 4 Hazmat/CBRN Protective Ensemble ~~(and Ensemble Elements)~~ .

An ensemble comprising ensemble elements that, when worn together, are designed to protect emergency ~~first~~ responders ~~personnel~~ at hazardous materials emergencies and CBRN terrorism incidents involving biological or radiological particulate hazards where concentrations are below ~~immediately dangerous to life and health (IDLH),~~ IDLH levels, thus permitting the use of ~~air-purifying respirators (APR) or powered air-purifying respirators (PAPR)~~ APR or PAPR equipment .

3.3.29.3.5 Class 5 Hazmat/CBRN Protective Ensemble ~~(and Ensemble Elements)~~ .

An ensemble comprising ensemble elements that, when worn together, are designed to protect emergency ~~first~~ responders ~~personnel~~ at hazardous materials emergencies and CBRN terrorism incidents involving ~~biological or radiological particulate hazards where concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR) or powered air-purifying respirators (PAPR)~~ flammable gases not toxic to the skin where the potential exists for chemical flash fires, further requiring the use of SCBA equipment .

~~**3.3.28*** Ensemble with Optional Flash Fire Escape and Liquefied Gas Protection (NFPA 1991).~~

~~A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for both *limited* protection against flash fire *for escape only* and protection against liquefied gases.~~

~~**A.3.3.28** Ensemble with Optional Flash Fire Escape Protection (NFPA 1991).~~

~~Ensembles meeting these requirements are intended to offer the wearer limited protection for escape only in situations that can result in flash fires. This requirement does not imply any protection for any firefighting activities but offers minimum protection from the thermal effects of a flash fire with no loss of suit gastight integrity.~~

~~**3.3.29*** Ensemble with Optional Flash Fire Escape Protection (NFPA 1991).~~

~~A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for limited protection against flash fire for escape only.~~

~~**A.3.3.28** Ensemble with Optional Flash Fire Escape Protection (NFPA 1991).~~

~~Ensembles meeting these requirements are intended to offer the wearer limited protection for escape only in situations that can result in flash fires. This requirement does not imply any protection for any firefighting activities but offers minimum protection from the thermal effects of a flash fire with no loss of suit gastight integrity.~~

~~**3.3.30*** Ensemble with Optional Liquefied Gas Protection (NFPA 1991).~~

~~A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for protection against liquefied gases.~~

~~**A.3.3.30** Ensemble with Optional Liquefied Gas Protection (NFPA 1991).~~

~~Ensembles meeting these requirements are intended to offer the wearer limited protection for exposure to liquefied gases for a maximum exposure time of 15 minutes.~~

Supplemental Information

File Name	Description	Approved
1990_SR_117_3.3.63.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 22:40:28 EST 2020

Committee Statement

Committee Statement: Multiple terms were left out of the first draft and were added and modified for consistency with the scope of the consolidated standard.

Response Message: SR-117-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 118-NFPA 1990-2020 [Section No. 3.3.67]

~~**3.3.31** Examination Glove.~~

~~An abbreviated term for emergency medical examination glove.~~ ~~*(See also 3.3.43 , Emergency Medical Examination Glove.)*~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:44:03 EST 2020

Committee Statement

Committee Statement: Definition should be removed because it is relevant to NFPA 1999 only.
Response Message: SR-118-NFPA 1990-2020

Public Comment No. 195-NFPA 1990-2020 [Section No. 3.3.67]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

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Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 119-NFPA 1990-2020 [Section No. 3.3.68]

~~**3.3.30** Exhaust Port.~~

~~An opening or aperture that releases exhaust to the outside environment.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:45:26 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-119-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 120-NFPA 1990-2020 [Sections 3.3.71, 3.3.72]

~~**3.3.35** First Responder.~~

~~A common term to describe public safety personnel not trained as emergency medical services providers that might respond to emergencies or other incidents.~~

~~**3.3.36** First Responder Personnel.~~

~~See 3.3.41 , Emergency First Responder Personnel.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:46:27 EST 2020

Committee Statement

Committee Statement: The terms are not used anywhere in the proposed standard and were removed.
Response Message: SR-120-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 121-NFPA 1990-2020 [Section No. 3.3.80.1]

~~**3.3.44.1** Outer Garment.~~

~~A garment worn over another garment component to meet the requirements of this standard.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:49:53 EST 2020

Committee Statement

Committee Statement: Paragraph 3.3.80.1 is redundant with paragraph 3.3.118
Response Message: SR-121-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 22-NFPA 1990-2020 [Section No. 3.3.82]

~~**3.3.46** Garment Closure Assembly.~~

~~See 3.3.6.1 .~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:00:09 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.
Response Message: SR-22-NFPA 1990-2020

Public Comment No. 20-NFPA 1990-2020 [Section No. 3.3.82]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 122-NFPA 1990-2020 [Section No. 3.3.92]

~~**3.3.56** Headform.~~

~~A device that simulates the configuration of the human head.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:50:53 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-122-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 123-NFPA 1990-2020 [Section No. 3.3.93]

~~**3.3.57** Helmet.~~

~~See 3.3.49 , Emergency Medical Helmet.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:51:55 EST 2020

Committee Statement

Committee Statement: Definition should be removed because it is relevant to NFPA 1999 only.
Response Message: SR-123-NFPA 1990-2020

Public Comment No. 197-NFPA 1990-2020 [Section No. 3.3.93]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 13-NFPA 1990-2020 [Section No. 3.3.94]

~~**3.3.58** Helmet Shell.~~

~~A helmet without the suspension system, accessories, and fittings.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:03:53 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-13-NFPA 1990-2020

Public Comment No. 198-NFPA 1990-2020 [Section No. 3.3.94]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 14-NFPA 1990-2020 [Sections 3.3.107, 3.3.108, 3.3.109, 3.3.110]

~~**3.3.71*** Medical Authority.~~

~~The person or structure responsible for patient care oversight.~~

~~**A.3.3.71** Medical Authority.~~

~~Individual agencies in the system might have medical directors that provide agency-specific or program-specific oversight. This could be a single physician or group of physicians, but there are examples of different authority modalities around the world.~~

~~**3.3.72*** Medical Care Facility Footwear.~~

~~An item of emergency medical protective clothing that is designed and configured to provide protection to the wearer's feet and ankles at medical care facilities.~~

~~**A.3.3.72** Medical Care Facility Footwear.~~

~~Medical care facility footwear is intended for use at medical care facilities where a hazard and risk hazard demonstrates that the likelihood of physical hazards warrants the use of footwear that does not provide toe impact and compression resistance or sole puncture resistance. This footwear differs from emergency medical protective footwear in that it does not require the toe impact and compression resistance and sole puncture resistance that is specified in ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear* (which replaced ANSI Z41, *Standard for Personal Protection — Protective Footwear*). The footwear is also not required to be as high as emergency medical footwear. However, medical care facility footwear still must provide the same material barrier and integrity performance criteria as specified for emergency medical footwear.~~

~~**3.3.73** Medical First Receivers.~~

~~Clinicians and other medical care staff at a medical care facility who have a role in emergency patient care including initial triage, decontamination, and treatment for patients who are delivered by emergency medical services or who self-present at a medical care facility, and those staff whose roles support these functions (e.g., security, set up, and patient tracking).~~

~~**3.3.74** Medical Responders.~~

~~See 3.3.53 , Emergency Medical Responders.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:04:35 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-14-NFPA 1990-2020

Public Comment No. 202-NFPA 1990-2020 [Section No. 3.3.110]

[Public Comment No. 199-NFPA 1990-2020 [Section No. 3.3.107]]
[Public Comment No. 201-NFPA 1990-2020 [Section No. 3.3.109]]
[Public Comment No. 200-NFPA 1990-2020 [Section No. 3.3.108]]
[Public Comment No. 234-NFPA 1990-2020 [Section No. A.3.3.107]]
[Public Comment No. 235-NFPA 1990-2020 [Section No. A.3.3.108]]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 124-NFPA 1990-2020 [Section No. 3.3.113]

~~**3.3.77*** Multiple Use.~~

~~Items that are designed to be repeatedly worn and used for protection during emergency medical operations.~~

~~**A.3.3.77** Multiple Use.~~

~~In this standard, garments, footwear, face protection devices, cleaning/utility gloves, and work gloves can be certified as multiple-use items. The continued use of these items is subject to applying the care and use instructions provided by the manufacturer. While some multiple-use items are evaluated for performance after repeated laundering, these conditioning treatments do not indicate a specific wear life for the item. The authority having jurisdiction is responsible for determining when any particular item should be retired based on its condition and expected performance in protecting the first responder or first receiver.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 22:53:51 EST 2020

Committee Statement

Committee Statement: Definition should be removed because it is relevant to NFPA 1999 only.
Response Message: SR-124-NFPA 1990-2020

Public Comment No. 203-NFPA 1990-2020 [Section No. 3.3.113]

Public Comment No. 236-NFPA 1990-2020 [Section No. A.3.3.113]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 15-NFPA 1990-2020 [Sections 3.3.114, 3.3.115]

~~**3.3.78*** Multiple-Use Emergency Medical Protective Ensemble.~~

~~Multiple elements of compliant protective clothing and equipment providing full body coverage, intended for multiple use, that when worn together provide protection from some risks, but not all risks, of emergency medical operations.~~

~~**A.3.3.78** Multiple-Use Emergency Medical Protective Ensemble.~~

~~Multiple-use medical protective ensembles are intended for high-risk applications where no exposed skin is permitted and the majority of the elements can be reused, if properly cleaned and decontaminated. High-risk applications include situations where there is an increased likelihood of contacting individuals or contaminated items where exposure to contaminated fluids can occur. The risk of exposure increases based on the amount and reliability of information available if an individual is infected with a liquid-borne pathogen, the expected proximity of the wearer to the affected individuals, the duration for which the wearer may be in proximity with an infected individual, and the likelihood for any exposure with contaminated liquids or waste as part of the operations.~~

~~Multiple-use protective ensembles further offer a higher degree of ruggedness and resistance to physical hazards. These ensembles consist of a multiple-use emergency medical garment that may be a coverall with or without a hood, or multiple garments that can include a hood. Hand protection is provided by the combination of a single-use examination glove worn underneath either a single-use emergency medical cleaning/utility glove or a multiple-use emergency medical work glove.~~

~~Foot protection is provided by multiple-use emergency medical or multiple-use medical care facility footwear. Footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 may be substituted since these items have demonstrated material, seam, and overall product biopenetration resistance, integrity, and physical hazard resistance that is equivalent or greater than multiple-use emergency medical footwear specified in NFPA 1999 . Garments that include bootie foot extensions as part of their construction can be used with any footwear that meets ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear* .~~

~~Single-use emergency medical footwear covers may be provided but are not required for the certification of these ensembles. These covers are suggested for minimizing contamination to more durable, reusable footwear. Eye or face protection is provided by either (1) a NIOSH-approved full facepiece air-purifying respirator (APR) with P100 filters, or (2) a NIOSH-approved appropriate tight or loose fitting powered air-purifying respirator (PAPR) with a protection level of HE. Alternative respiratory protective equipment can include CBRN APR, CBRN PAPR, or SCBA that is certified to NFPA 1981 .~~

~~**3.3.79** Nape Device.~~

~~A device located below the Bitragion Inion Arc used to aid in helmet retention.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:07:46 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.

Response Message: SR-15-NFPA 1990-2020

Public Comment No. 204-NFPA 1990-2020 [Section No. 3.3.114]

Public Comment No. 205-NFPA 1990-2020 [Section No. 3.3.115]

Public Comment No. 237-NFPA 1990-2020 [Section No. A.3.3.114]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 126-NFPA 1990-2020 [Section No. 3.3.118]

3.3.66* Outer Garment.

A ~~secondary~~ supplemental garment worn over the garment element to provide physical protection and meet the base or optional requirements of this standard.

A.3.3.66 Outer Garment.

Outer garments are not permitted for certification of NFPA 1991 garments for either base or optional flash fire and liquefied gas protection requirements.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 23:05:42 EST 2020

Committee Statement

Committee Statement: The term outer garment is used in Chapter 6 and should be indicated as additional rather than secondary.

Response Message: SR-126-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 23-NFPA 1990-2020 [Section No. 3.3.119]

~~**3.3.83** Outer Glove.~~

~~See 3.3.49.1 .~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:00:40 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.
Response Message: SR-23-NFPA 1990-2020

Public Comment No. 21-NFPA 1990-2020 [Section No. 3.3.119]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 16-NFPA 1990-2020 [Section No. 3.3.123]

~~3.3.87 Peak.~~

~~An integral part of the helmet shell extending forward over the eyes only.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:10:26 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-16-NFPA 1990-2020

Public Comment No. 206-NFPA 1990-2020 [Section No. 3.3.123]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 129-NFPA 1990-2020 [Sections 3.3.126, 3.3.127]

~~**3.3.90** Primary Garment Materials.~~

~~Materials limited to the garment material, hood material, visor material, glove material, footwear material, and, if present, elastomeric interface material that provide protection from chemical and physical hazards.~~

3.3.72 Primary Materials.

Element layers limited to the garment material, hood material, visor material, glove material, footwear material, and, if present, elastomeric interface material that provide protection from chemical and physical hazards.

~~**A.3.3.73** Primary Materials.~~

~~The primary materials can include, in addition to the materials noted in 3.3.127 , the wearer's respiratory protective equipment where designed to be worn outside the vapor-protective ensemble, the umbilical air hose, and all other exposed respiratory protective equipment materials designed to protect the wearer's breathing air and air path.~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 09:01:15 EST 2020

Committee Statement

Committee Statement: The term primary material has been retained while primary garment material is considered redundant. The annex information is no longer accurate.

Response Message: SR-129-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 24-NFPA 1990-2020 [Section No. 3.3.131]

~~**3.3.95** Radiological Particulate Terrorism Agents.~~

~~See 3.3.4.5 .~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:01:05 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.
Response Message: SR-24-NFPA 1990-2020

Public Comment No. 22-NFPA 1990-2020 [Section No. 3.3.131]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 130-NFPA 1990-2020 [Section No. 3.3.132]

~~**3.3.96** Radionuclide.~~

~~An isotope form of an element or radioactive element that emits radiation in excess of normal background radiation levels.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:02:36 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-130-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 131-NFPA 1990-2020 [Section No. 3.3.134]

3.3.77* Respirator.

A certified device that provides respiratory protection for the wearer ~~within the limits~~ and is worn as part of the ~~certification~~ ensemble .

A.3.3.77 Respirator.

Respirators for hazardous materials and CBRN terrorism incidents can include, but ~~might~~ are not ~~be~~ limited to, self-contained breathing apparatus (SCBA), supplied air respirators (SAR), air-purifying respirators (APR), and powered air-purifying respirators (PAPR). The minimum type of respirator for an individual ensemble can be determined using this standard.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 09:03:54 EST 2020

Committee Statement

Committee Statement: The principal term respirator is being retained with the removal of respiratory equipment. Other changes in the definition and annex were required to clarify the use of the term and accompanying information.

Response Message: SR-131-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 132-NFPA 1990-2020 [Section No. 3.3.135]

~~**3.3.99** Respiratory Equipment.~~

~~A positive-pressure, self-contained breathing apparatus (SCBA) or combination SCBA/supplied-air breathing apparatus.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:08:08 EST 2020

Committee Statement

Committee Statement: The term is not used anywhere in the proposed standard and was removed.
Response Message: SR-132-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 134-NFPA 1990-2020 [Section No. 3.3.137]

~~**3.3.101** Retroreflective Markings.~~

~~A material that reflects and returns a relatively high proportion of light in a direction in the direction close to the direction from which it came.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:12:01 EST 2020

Committee Statement

Committee Statement: Definition should be removed because it is relevant to NFPA 1999 only.
Response Message: SR-134-NFPA 1990-2020

Public Comment No. 208-NFPA 1990-2020 [Section No. 3.3.137]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 135-NFPA 1990-2020 [Section No. 3.3.143]

~~**3.3.107** Shell.~~

~~A helmet without the suspension system, accessories, and fittings.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:12:47 EST 2020

Committee Statement

Committee Statement: Definition should be removed because it is relevant to NFPA 1999 only.
Response Message: SR-135-NFPA 1990-2020

Public Comment No. 209-NFPA 1990-2020 [Section No. 3.3.143]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 17-NFPA 1990-2020 [Section No. 3.3.144]

~~**3.3.108*** Single-Use Emergency Medical Protective Ensemble.~~

~~Multiple elements of compliant protective clothing and equipment providing full body coverage, intended for a single use, that when worn together provide protection from some risks, but not all risks, of emergency medical operations.~~

~~**A.3.3.108** Single-Use Emergency Medical Protective Ensemble.~~

~~Single-use medical protective ensembles are intended for applications where no exposed skin is permitted and the majority of the elements, including the garment, gloves, footwear covers, and certain eye and face protection devices are disposable after use. These ensembles include a single-use medical protective garment that may be a coverall with or without a hood, or separate garments that can include a hood. These ensembles include two pairs of any NFPA 1999 -certified single-use emergency medical examination gloves.~~

~~The use of double gloving is a precaution intended to offer additional protection and minimize the risk of cross-contamination during doffing. The effect of the double glove system on hand function is not evaluated as part of this standard. These ensembles are also either configured with multiple-use emergency medical or multiple-use medical care facility footwear or single-use emergency medical footwear covers worn over standard footwear.~~

~~Footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 may be substituted since these items have demonstrated material, seam, and overall product biopenetration resistance, integrity, and physical hazard resistance that is equivalent or greater than multiple-use emergency medical footwear specified in NFPA 1999 .~~

~~If single-use footwear covers are used as part of the ensemble, then it is recommended that additional physical foot protection be achieved by the use of footwear that complies with ASTM F2413. Garments that include bootie foot extensions as part of their construction can be used with any footwear that meets ASTM F2413. Eye and face protection is provided by a combination of emergency medical eye and face protection devices that may include goggles and faceshields that comply with ANSI/ISEA Z87.1 requirements and respirators that are approved by NIOSH as N95 filtering facepieces that further demonstrate fluid resistance. Single-use medical protective ensembles may also be configured with the types of respirators established for multiple-use protective ensembles.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:41:11 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-17-NFPA 1990-2020

Public Comment No. 210-NFPA 1990-2020 [Section No. 3.3.144]

Public Comment No. 238-NFPA 1990-2020 [Section No. A.3.3.144]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 136-NFPA 1990-2020 [Section No. 3.3.145]

3.3.84* Single-Use Item.

~~Items that are designed to be used one time and then disposed of.~~ A designation applied to an ensemble or ensemble element indicating its one time use followed by disposal.

A.3.3.84 Single-Use Item.

~~What constitutes a "use" will be defined~~ The designation of an ensemble or ensemble element as "single-use only" is provided by the product manufacturer. A single use could include unpackaging, one donning, or one wearing while responding. In the absence of any manufacturer's specific information, one "use" should be considered any wearing of the item. Inspection of any item should be conducted in accordance with the manufacturer's instructions and NFPA 1891 and should assess the overall condition and suitability of an item for a specified use.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:14:34 EST 2020

Committee Statement

Committee Statement: The definition has been modified to meet a reporting requirement provided in Chapter 5.
Response Message: SR-136-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 18-NFPA 1990-2020 [Section No. 3.3.148]

~~**3.3.112** Splash-Resistant Eyewear.~~

~~Safety glasses, prescription eyewear with protective side shields, goggles, or chin-length faceshields that, when worn properly, provide limited protection against splashes, spray, spatters, or droplets of body fluids.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:43:21 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-18-NFPA 1990-2020

Public Comment No. 211-NFPA 1990-2020 [Section No. 3.3.148]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 25-NFPA 1990-2020 [Section No. 3.3.154]

~~**3.3.118** Toxic Industrial Chemicals.~~

~~See 3.3.4.6 .~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 13 14:01:35 EDT 2020

Committee Statement

Committee Statement: All definitions are duplicate entries therefore removal for consistency.

Response Message: SR-25-NFPA 1990-2020

Public Comment No. 23-NFPA 1990-2020 [Section No. 3.3.154]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 19-NFPA 1990-2020 [Section No. 3.3.162]

~~**3.3.126** Work Glove.~~

~~An abbreviated term for emergency medical work glove.~~ *~~(See also 3.3.56 , Emergency Medical Work Glove.)~~*

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 13:44:08 EDT 2020

Committee Statement

Committee Statement: Terms being deleted from the standard are exclusive to NFPA 1999.
Response Message: SR-19-NFPA 1990-2020

Public Comment No. 220-NFPA 1990-2020 [Section No. 3.3.162]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 73-NFPA 1990-2020 [Chapter 4]

Chapter 4 Certification ~~(NFPA 1991, NFPA 1992, and NFPA 1994)~~

4.1 General. ~~Administration (NFPA 1991, NFPA 1992, and NFPA 1994).~~

4.1.1

The process of ~~certifying~~ certification of protective ensembles and ensemble elements as being compliant with NFPA 1991, NFPA 1992 , and NFPA 1994 , as incorporated within the 2022 edition of NFPA 1990, shall meet the requirements of ~~4.1.4~~ 4.1 through 4.8.

4.1.2

All compliant ensembles and ensemble elements that are labeled as being compliant with this standard shall meet or exceed all the applicable requirements specified in this standard and shall be certified.

4.1.3

All certification shall be performed by a certification organization that meets at least the requirements specified in Section 4.2 and that is accredited for personal protective equipment in accordance with ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes, and services*. The accreditation shall be issued by an accreditation body operating in accordance with ISO/IEC 17011, *Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*.

4.1.4*

Manufacturers shall not claim compliance with portions or segments of the applicable requirements of this standard and shall not use the NFPA name or the name or identification of this standard~~, NFPA 1990~~ , in any statements about their respective product(s) unless the product(s) ~~is~~ are certified as compliant with this standard.

A.4.1.4

The compliance of vapor-protective ensembles in meeting this standard is determined by the NFPA battery of chemicals. Each vapor-protective ~~suit~~ garment meeting the requirements of this standard has a list of chemicals or chemical mixtures associated with it.

4.1.4.1

In order to label products according to Chapter 5 of this standard, manufacturers shall demonstrate that their products meet all the applicable design requirements and performance requirements as outlined in Chapter 6 and Chapter 7 , respectively.

4.1.5

All compliant protective ensembles and ensemble elements shall be labeled and listed.

4.1.5.1

The certification organization shall publicly list the following information ~~on~~ for the certified ensembles or ensemble elements where applicable :

(1) Manufacturer's name

(2) Model number (which might include the SKU, minus the socks)

(3) Description of the item

(4) Glove manufacturer's name and model number

(5) Footwear manufacturer's name and model number

(6) Respirator manufacturer's name and model number

(7) Requirements to which the ensemble(s) or ensemble element(s) are certified

(8) Standard to which the ensemble(s) or ensemble element(s) ~~is~~ are certified

(9) Hood manufacturer's name and model number

4.1.6

All compliant ensembles and ensemble elements shall ~~also~~ have ~~a~~ product labels that meet~~s~~ the applicable requirements specified in ~~Section 5.1~~ Chapter 5 .

4.1.7*

The certification organization's label, symbol, or identifying mark shall be attached to the product label, ~~or~~ shall be part of the product label, or shall be immediately adjacent to the product label.

4.1.8

The certification organization shall not issue any new certifications ~~to~~ based on the ~~2005 edition of NFPA 1991~~ following standards on or after the NFPA effective date ~~for~~ of the ~~2016 edition, which is December 4, 2015.~~ 2022 edition of NFPA 1990:

(1) 2016 edition of NFPA 1991

(2) 2018 edition of NFPA 1992

(3) 2018 edition of NFPA 1994

4.1.9

The certification organization shall not permit any manufacturer to continue to label any ensembles or ensemble elements that are certified as compliant with the ~~2005~~ 2016 edition of NFPA 1991, the 2018 edition of NFPA 1992 , or the 2018 edition of NFPA 1994 on or after ~~December 4, 2016~~ the NFPA effective date for the 2022 edition of NFPA 1990, plus 12 months .

4.1.10

The certification organization shall require manufacturers to remove all certification labels and product labels indicating compliance with the ~~2005~~ 2016 edition of NFPA 1991, the 2018 edition of NFPA 1992 , or the 2018 edition of NFPA 1994 from all ensembles and ensemble elements that are under the control of the manufacturer on ~~December 4, 2016,~~ the effective date of the 2022 edition of NFPA 1990, plus 12 months, and the certification organization shall verify that this action is taken.

~~**4.1.2** Purpose.~~

~~**4.1.2.1**~~

~~The purpose of Chapters 4 through 8 shall be to establish a minimum level of protection for emergency response personnel against adverse vapor, liquid-splash, and particulate environments during hazardous materials incidents and against specified chemical and biological terrorism agents in vapor, liquid-splash, and particulate environments during CBRN terrorism incidents.~~

~~**4.1.3** Application.~~

~~**4.1.3.1**~~

~~Chapters 4 through 8 shall apply to the design, manufacturing, testing, documentation, and certification of new vapor-protective ensembles and ensemble elements, new liquid-splash ensembles and ensemble elements, and new protective ensembles and ensemble elements for CBRN incidents. This edition of NFPA 1990 shall not apply to vapor-protective ensembles and ensemble elements manufactured to previous editions of NFPA 1991 , NFPA 1992 , or NFPA 1994 .~~

~~**4.1.3.2**~~

~~This standard alone shall not apply to protective clothing for any firefighting applications.~~

~~**4.1.3.3**~~

~~The requirements of this standard shall not apply to any accessories that could be attached to the product but are not necessary for the product to meet the requirements of this standard.~~

4.1.11 Scope.

~~**4.1.1.1***~~

~~Chapters 4 through 8 shall specify minimum requirements for the design, performance, testing, documentation, and certification of vapor-protective ensembles and ensemble elements, liquid-splash ensembles and ensemble elements used by emergency response personnel during hazardous materials incidents, and protective clothing used by emergency response personnel during chemical, biological, radiological, or nuclear (CBRN) incidents.~~

4.1.11.1

This standard shall not be construed as addressing all of the safety concerns, if any, associated with its use for the designing, manufacturing, testing, or certifying of product to meet the requirements of this standard. It shall be the responsibility of the persons and organizations that use this standard to establish safety and health practices and determine the applicability of regulatory limitations prior to use of this standard.

4.1.11.2

Nothing herein shall restrict any jurisdiction or manufacturer from exceeding these minimum requirements.

4.1.12 Purpose.

4.1.12.1

The purpose of Chapters 4 through 8 shall be to establish a minimum level of protection for emergency response personnel against adverse vapor, liquid-splash, and particulate environments during hazardous materials incidents and against specified chemical and biological terrorism agents in vapor, liquid-splash, and particulate environments during CBRN terrorism incidents.

4.1.12.2

Controlled laboratory tests used to determine compliance with the performance requirements of this standard shall not be deemed as establishing performance levels for all situations to which personnel can be exposed.

4.1.12.3

This standard is not intended to be utilized as a detailed manufacturing or purchase specification but shall be permitted to be referenced in purchase specifications as minimum requirements.

~~**4.1.3** Application.~~

~~**4.1.3.1**~~

~~Chapters 4 through 8 shall apply to the design, manufacturing, testing, documentation, and certification of new vapor-protective ensembles and ensemble elements, new liquid-splash ensembles and ensemble elements, and new protective ensembles and ensemble elements for CBRN incidents. This edition of NFPA 1990 shall not apply to vapor-protective ensembles and ensemble elements manufactured to previous editions of NFPA 1991 , NFPA 1992 , or NFPA 1994 .~~

~~**4.1.3.3**~~

~~The requirements of this standard shall not apply to any accessories that could be attached to the product but are not necessary for the product to meet the requirements of this standard.~~

~~**4.1.4** General.~~

4.2 Certification Program .

4.2.1*

The certification organization shall not be owned or controlled by manufacturers or vendors of the product being certified.

4.2.2

The certification organization shall be primarily engaged in certification work and shall not have a monetary interest in the product's ultimate profitability.

4.2.3

The certification organization shall be accredited for personal protective equipment in accordance with ISO/IEC 17065~~, *Conformity assessment — Requirements for bodies certifying products, processes and services*~~ . The accreditation shall be issued by an accreditation body operating in accordance with ISO/IEC 17011.~~, *Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*~~

4.2.4

The certification organization shall refuse to certify products to this standard ~~that~~ if the products do not comply with all the applicable requirements of this standard.

4.2.5*

The contractual provisions between the certification organization and the manufacturer shall specify that certification is contingent on compliance with all the applicable requirements of this standard.

4.2.5.1

The certification organization shall not offer or confer any conditional, temporary, or partial certifications.

4.2.5.2

Manufacturers shall not be authorized to use any label or reference to the certification organization on products that are not compliant with all the applicable requirements of this standard.

4.2.6*

The certification organization shall have ~~or have~~ access to laboratory facilities and equipment for conducting proper tests to determine product compliance.

4.2.6.1

The certification organization laboratory facilities shall have a program in place and functioning for the calibration of all instruments, and procedures shall be in ~~use~~ place to ensure proper control of all testing.

4.2.6.2

The certification organization laboratory facilities shall follow good practice regarding the use of laboratory manuals, form data sheets, documented calibration and calibration routines, performance verification, proficiency testing, and staff qualification and training programs.

4.2.7

The certification organization shall require the manufacturer to establish and maintain a quality assurance program that meets the requirements of Section 4.5.

4.2.7.1*

The certification organization shall require the manufacturer to have a safety alert and product recall system, as specified in Section 4.8, as part of the manufacturer's quality assurance program.

4.2.7.2

The certification organization shall audit the manufacturer's quality assurance program to ensure that the quality assurance program provides continued product compliance with this standard.

4.2.8

The certification organization and the manufacturer shall evaluate any changes affecting the form, fit, or function of ~~the~~ compliant products ~~to determine its~~ to ensure their continued certification to this standard.

4.2.9*

The certification organization shall have a follow-up inspection program ~~of~~ for the manufacturing facility's compliant product with at least two random and unannounced visits per 12-month period to verify the product's continued compliance. Where portions of the production process are carried out by multiple facilities, the certification organization shall determine the appropriate follow-up program for the facilities that most closely meet the definition of a manufacturing facility *(See 3.3.60, Manufacturing Facility)*.

4.2.9.1

As part of the follow-up inspection program, the certification organization shall select sample compliant product at random from the manufacturing facility's production line, from the manufacturer's or manufacturing facility's in-house stock, or from the open market.

4.2.9.2

Sample product shall be evaluated by the certification organization to verify the product's continued compliance ~~in order to assure~~ and to ensure that the materials, components, and manufacturing quality assurance systems are consistent with the materials, components, and manufacturing quality assurance systems that were inspected and tested by the certification organization during initial certification and ~~recertification~~ annual reverification.

4.2.9.3

The certification organization shall be permitted to conduct specific testing to verify ~~the~~ a product's continued compliance.

4.2.9.4

For products, components, and materials where prior testing, judgment, and experience of the certification organization have shown results to be in jeopardy of not complying with this standard, the certification organization shall conduct more frequent testing of sample product, components, and materials ~~acquired in accordance with 4.8.1~~ against the applicable requirements of this standard in accordance with 4.8.1.

4.2.10

The certification organization shall have in place a series of procedures, as specified in Section 4.6, that address reports of situations in which a compliant product is subsequently found to be hazardous.

4.2.11

The certification organization's operating procedures shall ~~provide~~ include a mechanism for the manufacturer to appeal decisions. The procedures shall include the presentation of information from both sides of a controversy to a designated appeals panel.

4.2.12

The certification organization shall be in a position to use legal means to protect the integrity of its name and label. The name and label shall be registered and legally defended.

4.3 Inspection and Testing.

4.3.1

For both initial certification and recertification of protective ensembles and ensemble elements, the certification organization shall conduct both inspection and testing as specified in this section.

4.3.2

All inspections, evaluations, conditioning, and testing for certification or for ~~recertification~~ annual verification shall be conducted by a certification organization's testing laboratory that is accredited in accordance with the requirements of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*.

4.3.2.1

The certification organization's testing laboratory's scope of accreditation to ISO/IEC 17025~~,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ ~~,~~ shall encompass testing of personal protective equipment.

4.3.2.2

The accreditation of a certification organization's testing laboratory shall be issued by an accreditation body operating in accordance with ISO/IEC 17011~~,~~ ~~*Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*~~ .

4.3.3

A certification organization shall be permitted to utilize results from conditioning and testing ~~results~~ conducted by a product or component manufacturer for certification or ~~recertification~~ annual verification provided the manufacturer's testing laboratory meets the requirements specified in 4.3.3.1 through 4.3.3.5.

4.3.3.1

The manufacturer's testing laboratory shall be accredited in accordance with the requirements of ISO/IEC 17025~~,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ .

4.3.3.2

The manufacturer's testing laboratory's scope of accreditation to ISO/IEC 17025~~,~~ ~~*General requirements for the competence of testing and calibration laboratories*~~ ~~,~~ shall encompass testing of personal protective equipment.

4.3.3.3

The accreditation of a manufacturer's testing laboratory shall be issued by an accreditation body operating in accordance with ISO/IEC 17011~~,~~ ~~*Conformity assessment — Requirements for accreditation bodies accrediting conformity assessment bodies*~~ .

4.3.3.4

The certification organization shall approve the manufacturer's testing laboratory.

4.3.3.5

The certification organization shall determine the level of supervision and witnessing of the conditioning and testing ~~for~~ required for the certification or ~~recertification~~ annual verification conducted at the manufacturer's testing laboratory.

4.3.4

Sampling levels for testing and inspection shall be established by the certification organization and the manufacturer to ensure ~~a~~ reasonable and acceptable reliability at a reasonable and acceptable confidence level that products certified to this standard are compliant, unless such sampling levels are specified herein. ~~This information shall be included in the manufacturer's technical data package.~~

4.3.5

Inspection by the certification organization shall include a review of all product labels to ensure that all the required label attachments, compliance statements, certification statements, and other product information are at least as specified for the ensembles and ensemble elements ~~in Section 5.1~~ per the applicable requirements of Chapter 5 .

4.3.6

Inspection by the certification organization shall include an evaluation of any symbols or graphic representations used on product labels or in user information, as permitted by 5.1.1.5, to ensure that the symbols or graphic representations are clearly explained in the product's user information package.

4.3.7

Inspection by the certification organization shall include a review of the user information required by the applicable sections of ~~5.1.2~~ Chapter 5 to ensure that the information has been developed and is available.

4.3.8

Inspection by the certification organization shall include a review of the Technical Data Package to determine compliance with the applicable requirements of ~~Section 5.3~~ Chapter 5 .

4.3.9

Inspection and evaluation by the certification organization for determining compliance with the applicable design requirements specified in Chapter 6 shall be performed on whole or complete products.

4.3.10

Testing to determine product compliance with the applicable performance requirements specified in Chapter 7 shall be conducted by the certification organization in accordance with the specified testing requirements of Chapter 8.

4.3.10.1

Testing shall be performed on specimens representative of materials and components used in the actual construction of the protective ensembles and ensemble elements .

4.3.10.2

The certification organization ~~also~~ shall also be permitted to use sample materials cut from a representative product.

4.3.11

The certification organization shall accept from the manufacturer, for evaluation and testing for certification, only product or product components that are the same in every respect ~~to~~ as the actual final products or product components .

4.3.12

The certification organization shall not allow any modifications, pretreatment, conditioning, or other such special processes of the product or any product component prior to the product's submission for evaluation and testing by the certification organization.

4.3.13

The certification organization shall not allow the substitution, repair, or modification, other than as specifically permitted herein, of any product or any product component during testing.

4.3.14

The certification organization shall not allow test specimens that have been conditioned and tested for one method to be reconditioned and tested for another test method unless specifically permitted ~~in~~ by the test method.

4.3.15

The certification organization shall test ensemble elements with the specific ensemble(s) with which they are to be certified.

4.3.16*

Any change in the design, construction, or material of a compliant product shall necessitate new inspection and testing to verify its compliance ~~to~~ with all the applicable requirements of this standard that the certification organization determines can be affected by such change. This recertification shall be conducted before labeling the modified product as being compliant with this standard.

A.4.3.16

Manufacturers are not limited in their approaches ~~for~~ to designing ~~vapor-protective~~ ensembles compliant with this standard. If the ~~suit~~ garment design uses combinations of materials or garments to meet one part of the standard, then the same combinations must be assessed for all parts of the standard. For example, if a two-part visor is used such that the visor materials meet the chemical resistance requirement, the outer visor cannot be removed to meet the light transmission requirement. The same configuration must be used for all the performance requirements.

4.3.17

The manufacturer shall maintain all the design and performance inspection and test data from the certification organization used in the certification of the manufacturer's compliant product. The manufacturer shall provide such data, upon request, to the purchaser or authority having jurisdiction.

4.3.18

The certification organization shall ensure that the manufacturer tests each vapor-protective ensemble for gastight integrity as specified in ASTM F1052, *Standard Test Method for Pressure Testing Vapor Protective Suits*. Each ensemble shall show an ending pressure of at least 797 Pa (3.2 in. water gauge) pressure. The date of the test shall be placed on the product label as specified in 5.1.1.7(9). The manufacturer shall provide the result ~~with~~ for each ensemble.

~~**4.2** Administration Specific to NFPA 1991.~~

~~**4.2.1** Scope Specific to NFPA 1991.~~

~~**4.2.1.1**~~

~~This standard shall also specify additional optional criteria for vapor-protective ensembles that provide escape protection from chemical flash fires encountered during hazardous materials incidents.~~

~~**4.2.1.2**~~

~~This standard shall specify requirements for new vapor-protective ensembles and new ensemble elements.~~

~~**4.2.1.3**~~

~~This standard alone shall not specify requirements for protective clothing for any firefighting applications.~~

~~**4.2.1.4**~~

~~This standard alone shall not specify requirements for protection against ionizing radiation, cryogenic liquid hazards, or explosive atmospheres.~~

~~**4.2.1.5**~~

~~This standard shall not specify requirements for the respiratory protection that is necessary for proper protection with the protective ensemble. Respiratory protection for hazardous materials emergencies and CBRN terrorism incidents is a critical part of the overall protection and shall be specified by the authority having jurisdiction.~~

~~**4.2.1.6**~~

~~Certification of compliant vapor-protective ensembles and compliant elements to the requirements of this standard shall not preclude certification to additional appropriate standards where the ensemble or ensemble elements meet all the applicable requirements of each standard.~~

~~**4.2.2** Purpose Specific to NFPA 1991.~~

~~**4.2.2.1**~~

~~The purpose of this standard shall also be to establish a minimum level of liquefied gas protection as an option for compliant vapor-protective ensembles and compliant ensemble elements.~~

~~**4.2.2.2**~~

~~The purpose of this standard shall be to establish a minimum level of limited chemical flash fire protection, for escape only in the event of a chemical flash fire, as an option for compliant vapor-protective ensembles and compliant ensemble elements.~~

~~**4.2.2.3**~~

~~The purpose of these options shall be to provide emergency response organizations the flexibility to specify neither, one, or both of these options in their purchase specifications according to the anticipated exposure and expected needs of the emergency response organization.~~

~~**4.2.3** Application Specific to NFPA 1991.~~

~~**4.2.3.1**~~

~~This standard alone shall not apply to protective clothing for protection against ionizing radiation, cryogenic liquid hazards, or explosive atmospheres.~~

~~**4.2.3.2**~~

~~This standard shall not apply to requirements for vapor-protective ensembles or ensemble elements these requirements are specified in NFPA 1500 .~~

~~**4.2.3.3**~~

~~Requirements of this standard shall not apply to the use of closed-circuit SCBA.~~

~~**4.2.4** Annual Verification Specific to NFPA 1991.~~

~~**4.2.4.1** Annual Verification of Product Compliance.~~

~~**4.2.4.1.1**~~

~~All vapor-protective ensemble models and all individual element models that are labeled as being compliant with this standard shall, on an annual basis, undergo recertification that includes inspection and evaluation to all design requirements and testing to all performance requirements as required by this standard on all manufacturer's models and components as required by 4.1.7.3 .~~

~~**4.2.4.1.1.1**~~

~~Any change that affects the ensemble or element performance under design or performance requirements of this standard shall constitute a different model.~~

~~**4.2.4.1.1.2**~~

~~For the purpose of this standard, models shall include each unique pattern, style, or design of the individual element.~~

~~**4.2.4.1.2**~~

~~Samples of the manufacturer's models and components for recertification shall be acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up inspection program. For recertification, the certification organization shall acquire at least one complete vapor-protective ensemble sample outfitted with all manufacturer-provided external fittings. The certification organization shall also acquire a sufficient quantity of component samples to be tested for recertification as required by 4.2.4.1.3 .~~

~~**4.2.4.1.3**~~

~~Sample vapor-protective ensembles and components shall be inspected, evaluated, and tested as follows.~~

~~**4.2.4.1.4**~~

~~The manufacturer shall maintain all design, inspection, performance, and test data from the certification organization produced during the recertification of manufacturers' models and components. The manufacturer shall provide such data, upon request, to the purchaser or the authority having jurisdiction.~~

~~**4.3** Administration Specific to NFPA 1992.~~

~~**4.3.1** Scope Specific to NFPA 1992.~~

~~**4.3.1.1**~~

~~This standard shall also specify additional optional criteria for liquid splash-protective ensembles only for escape protection from chemical flash fires encountered during hazardous materials incidents.~~

~~**4.3.1.2**~~

~~This standard shall specify requirements for new liquid splash-protective ensembles, new ensemble elements, and new protective clothing.~~

~~**4.3.1.2.1**~~

~~Ensemble elements shall include garments, gloves, footwear, and hoods.~~

~~**4.3.1.3**~~

~~This standard alone shall not specify requirements for protective ensembles or clothing for hazardous materials emergencies where the hazardous material is present as a gas or a vapor-producing liquid at vapor concentrations known to be toxic to the skin.~~

~~**4.3.1.4***~~

~~This standard alone shall not specify requirements for protection from chemical or biological terrorism agents or from chemical or biological terrorism incidents. Requirements for such protection shall be provided by protective ensembles that are certified as compliant with NFPA 1994 or ensembles that are certified as compliant with NFPA 1991 .~~

~~**A.4.3.1.4**~~

~~See A.4.3.1.3 .~~

~~**4.3.1.5***~~

~~This standard alone shall not specify requirements for protective clothing for any fire-fighting applications.~~

~~**A.4.3.1.5**~~

~~See A.4.3.1.3 .~~

~~**4.3.1.6***~~

~~This standard alone shall not specify requirements for protection from ionizing radiation; biological, liquefied gas, or cryogenic liquid hazards; or explosive atmospheres caused by vapors, dust, or particulates.~~

~~A.4.3.1.6~~

~~See A.4.3.1.3 .~~

~~4.3.1.7*~~

~~This standard shall not specify requirements for the respiratory protection that is necessary for proper protection with the protective ensemble.~~

~~4.3.1.8~~

~~This standard shall not specify requirements for any accessories that could be attached to the product but are not necessary for the product to meet the requirements of this standard.~~

~~4.3.1.9~~

~~Certification of compliant liquid splash-protective ensembles, ensemble elements, and protective clothing to the requirements of this standard shall not preclude certification to additional appropriate standards where the ensemble, ensemble elements, or protective clothing meet all the applicable requirements of each standard.~~

~~4.3.2~~ ~~Purpose Specific to NFPA 1992.~~

~~4.3.2.1~~

~~The purpose of this standard shall also be to establish a minimum level of limited chemical flash fire protection, for escape only in the event of a chemical flash fire, as an option for compliant ensembles, ensemble elements, and protective clothing.~~

~~4.3.2.2~~

~~The purpose of this standard shall be to provide emergency response organizations the flexibility to specify the option in 1.2.1.1 in their purchase specifications according to the anticipated exposure and expected needs of the emergency response organization.~~

~~4.3.3~~ ~~Application Specific to NFPA 1992.~~

~~4.3.3.1~~

~~This standard alone shall not specify requirements for protective ensembles or clothing for hazardous materials emergencies where the hazardous material is present as a gas or a vapor-producing liquid at vapor concentrations known to be toxic to the skin.~~

~~4.3.3.2~~

~~This edition of NFPA 1990 shall not apply to liquid splash-protective ensembles, ensemble elements, and protective clothing manufactured to previous editions of this standard.~~

~~4.3.3.3~~

~~This standard alone shall not apply to protective clothing for any firefighting applications.~~

~~4.3.3.4~~

~~This standard alone shall not apply to protective clothing for protection from ionizing radiation, cryogenic liquid hazards, or explosive atmospheres caused by vapor, dust, or particulates.~~

~~4.3.3.5~~

~~This standard shall not apply to the respiratory protection that is necessary for proper protection with the liquid splash-protective ensemble or protective clothing.~~

~~4.3.3.6~~

~~This standard shall not apply to use requirements for liquid splash-protective ensembles or protective clothing; such requirements are specified in NFPA 1500 .~~

~~4.3.4~~ ~~Annual Verification Specific to NFPA 1992.~~

~~**4.3.4.1** Annual Verification of Product Compliance Specific to NFPA 1992.~~

~~**4.3.4.1.1**~~

~~All ensembles and ensemble elements that are labeled as being compliant with this standard shall undergo recertification on an annual basis. This recertification shall include inspection and evaluation to all design requirements and testing to all performance requirements as required by this standard on all manufacturer models and components as specified in 9.5.3.~~

~~**4.3.4.1.1.1**~~

~~Any change that affects the element's performance under design or performance requirements of this standard shall constitute a different model.~~

~~**4.3.4.1.1.2**~~

~~For the purpose of this standard, models shall include each unique pattern, style, or design of the element.~~

~~**4.3.4.1.2**~~

~~Samples of manufacturer's models and components for recertification shall be acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up inspection program. For recertification, the certification organization shall acquire at least one liquid splash-protective garment, one pair of liquid splash-protective gloves, one pair of liquid splash-protective footwear, and one complete liquid splash-protective nonencapsulating or encapsulating ensemble outfitted with all manufacturer-provided external fittings. The certification organization shall also acquire a sufficient quantity of component samples to be tested for recertification as required by 9.5.3.~~

~~**4.3.4.1.3**~~

~~Liquid splash-protective ensembles, ensemble elements, and ensemble components shall be inspected, evaluated, and tested for annual recertification.~~

~~**4.3.4.1.4**~~

~~The manufacturer shall maintain all design and performance inspection and test data from the certification organization used in the recertification of manufacturer's models and components. The manufacturer shall provide such data, upon request, to the purchaser or the AHJ.~~

4.4 Annual Verification .

4.4.1 General Annual Verification of Product Compliance.

4.4.1.1

All ensemble and ensemble element models that are labeled as being compliant with this standard shall, on an annual basis, undergo a verification evaluation that includes inspection, review of all design requirements, and testing to all performance requirements as required by this standard.

4.4.1.2

Any change that affects the ensemble or ensemble element performance requirements of this standard shall constitute a different model.

4.4.1.3

For the purposes of this standard, models shall include each unique pattern, style, or design of individual elements.

4.4.1.4

Samples of the ensembles, ensemble elements, and their components for verification shall be acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up inspection program. The certification organization shall acquire a sufficient quantity of samples to be tested for verification as required by 4.4.2 , 4.4.3 , or 4.4.4 , depending on the applicable certification standard.

4.4.1.5

Sample ensembles, ensemble elements, and their components shall be inspected, evaluated, and tested as required by 4.4.2, 4.4.3, or 4.4.4, depending on the applicable certification standard.

4.4.1.6

The manufacturer shall maintain all design, inspection, performance, and test data from the certification organization produced during the verification of the manufacturer's models and components. The manufacturer shall provide such data, upon request, to the purchaser or the authority having jurisdiction.

4.4.2 Annual Verification of Product Compliance Specific to NFPA 1991.

4.4.2.1

Each vapor-protective ensemble shall be inspected and evaluated ~~to each of the~~ based on all the applicable design requirements specified in Chapter 6.

4.4.2.2

A single specimen of each vapor-protective ensemble shall be tested for overall performance as specified in ~~Section 7.1~~ Chapter 7 using the following sequence of tests:

~~The vapor-protective ensemble specimen shall be tested for gastight integrity in accordance with 8.2.1.~~

(1) The vapor-protective ensemble specimen shall ~~then~~ be tested for liquidtight integrity as specified in ~~8.2.3~~ 7.1.1.1.

(2) The vapor-protective ensemble specimen shall ~~then~~ be tested for overall function and integrity as specified in ~~8.6.1~~ 7.1.1.1.

(3) The vapor-protective ensemble specimen shall ~~then~~ be tested for airflow capacity as specified in ~~8.6.2~~ 7.1.1.1.5 and 7.1.1.1.5.1.

(4) A minimum of one new vapor-protective ensemble specimen shall ~~then~~ be tested for overall inward leakage as specified in ~~8.6.3~~ 7.1.1.1.1.

(5) If certified for optional chemical flash fire protection as specified in ~~7.1.8.1~~ 7.1.8, a new vapor-protective ensemble specimen shall ~~then~~ be tested for overall ensemble flash protection as specified in ~~8.4.3~~ 7.1.8.1.

4.4.2.3

All ~~suit, visor, glove, footwear~~ base performance requirements , optional chemical flash fire ~~protection~~ performance requirements , and optional liquefied gas ~~protection~~ performance requirements shall be evaluated as specified in Chapter 7, except the requirements ~~of 7.1.6~~ in 7.1.1.3.3 and 7.1.1.3.4 , with the following modifications:

(1) Chemical permeation resistance testing shall be limited to the testing specified in ~~7.1.2.1 through 7.1.2.3~~ 7.1.2.1 and limited to the following chemicals:

(a) Acrylonitrile

(b) Carbon disulfide

(c) Dichloromethane

(d) Diethylamine

(e) Methanol

(f) Tetrahydrofuran

(2) Chemical permeation resistance testing required for ensembles certified for optional liquefied gas protection, as specified in 7.2.4, shall be limited to ammonia.

(3) Chemical penetration resistance testing shall be limited to the testing specified in 7.1.2.5 and limited to the following chemicals:

(a) Carbon disulfide

(b) Dichloromethane

(c) Diethylamine

(d) Methanol

(e) Tetrahydrofuran

(4) ~~If the number of specimens is greater than two in the initial testing, a total of two specimens shall be permitted for annual testing requirements.~~ A total of two specimens shall be permitted for testing requirements. If testing is specified for both directions of a material, a total of two specimens per material direction shall be permitted for testing requirements.

~~If testing is specified for both directions of a material, a total of two specimens per material direction shall be permitted for testing requirements.~~

4.4.3 Annual Verification of Product Compliance Specific to NFPA 1992.

4.4.3.1

Each liquid splash-protective ensemble and ensemble element shall be inspected and evaluated to ~~each of the~~ all the applicable design requirements specified in Chapter 6.

4.4.3.2

Each liquid splash-protective ensemble specimen shall be tested for overall performance as specified in ~~Section 7.1~~ Chapter 7 using the following sequence of tests:

~~The liquid splash-protective ensemble specimen shall then be tested for liquidtight integrity as specified in 8.2.3.1 .~~

(1) The liquid splash-protective ensemble specimen shall then be tested for overall function and integrity as specified in ~~8.6.1~~ 7.1.1.1.4 .

(2) If certified for optional chemical flash fire protection as specified in 7.1.8 , the liquid splash-protective ensemble shall ~~then~~ be tested for overall ensemble flash protection as specified in ~~8.4.3~~ 7.1.8 .

4.4.3.3*

All ~~garment material, visor, glove, footwear, hoods, and optional chemical flash fire protection performance requirements~~ liquid splash-protective ensembles, ensemble elements, and components shall be evaluated as specified in Chapter ~~12~~ 7 , with the following modifications:

(1) Chemical penetration resistance testing shall be limited to the testing specified in 8.3.2, 8.3.3, and 8.3.4, and shall be performed ~~against~~ using the following chemicals:

(a) Fuel H — surrogate gasoline [42.5 percent toluene, 42.5 percent isooctane, and 15 percent denatured ethanol, volume/volume (v/v)] as defined in ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids*.

(b) Methyl isobutyl ketone, CAS No. 108-10-1, >95 percent, weight/weight (w/w)

(c) Sulfuric acid, CAS No. 7664-93-9, 93.1 percent, w/w

(2) A total of two specimens shall be permitted for testing requirements. If the testing is specified for both directions of a material, a total of two specimens per material direction shall be permitted for testing requirements.

A.4.4.3.3

A subset of ~~the~~ chemicals has been chosen from the full battery of ~~10~~ chemicals ~~that are~~ specified in ~~8.4.3.2~~ 7.3.2 to represent ~~those~~ the potential chemical challenges ~~deemed representative for~~ one can encounter when periodically assessing material performance and the barrier characteristics of seams and closures. Fuel H was selected to represent a hydrocarbon mixture that simulates gasoline and potentially affects adhesives that might be used in seams and closures~~;~~ , methyl isobutyl ketone ~~provides~~ is a low surface tension chemical that has some degradation effects on materials~~;~~ , and sulfuric acid is a ~~representative~~ strong inorganic acid and corrosive liquid.

4.4.4 Annual Verification of Product Compliance Specific to NFPA 1994.

4.4.4.1

One sample of each compliant product shall be inspected and evaluated ~~to the~~ using all the applicable design requirements specified in Chapter ~~4~~ 6 .

4.4.4.2

~~One~~ A minimum of one specimen of each compliant ensemble shall be ~~permitted to be~~ tested for ~~each~~ overall ensemble performance ~~test~~ as specified ~~in the ensemble general requirements~~ in Chapter 7 using the following sequence of tests:

(1) Where the ensemble is certified to Class 1, 2, 2R, 3, or 3R, the following sequence is permitted:

(a) The ensemble specimen shall be tested for liquid integrity as specified in 7.1.1.1.2 .

(b) The ensemble specimen shall be tested for overall function and integrity as specified in 7.1.1.1.4 .

(c) A new ensemble specimen shall be tested for inward vapor leakage as specified in 7.1.1.1.1 .

(d) Where the ensemble is encapsulating and certified to Class 1, 2, or 2R, the ensemble specimen shall be tested for airflow capacity as specified in 7.1.1.1.5 and 7.1.1.1.5.2 .

(2) Where the ensemble is certified to Class 4 or 4R, the following sequence is permitted:

(a) The ensemble specimen shall be tested for liquid integrity as specified in 7.1.1.1.2 .

(b) The ensemble specimen shall be tested for overall function and integrity as specified in 7.1.1.1.4 .

(c) Inward particle leakage as specified in 7.1.1.1.3 shall not be performed.

(3) Where the ensemble is certified to Class 5, the following sequence is permitted:

(a) The ensemble specimen shall be tested for overall flash fire performance.

(4) Where the ensemble is certified for optional chemical flash fire protection as specified in 7.1.8 , a new ensemble shall be tested for overall ensemble flash protection as specified in 7.1.8.1 .

4.4.4.3

Each ~~compliant element~~ ensemble, ensemble element, and component shall be tested ~~for overall performance~~ as specified ~~in the appropriate element requirements~~ in Chapter 7, with the following modifications:

(1) Chemical permeation resistance testing ~~specified~~ for Class 1 ensembles shall be limited to the testing specified in 7.1.2.2 and the following chemicals:

(a) Ammonia

(b) Acrolein

(c) Acrylonitrile

(d) Chlorine

(e) Dimethyl sulfate

(2) Chemical permeation resistance testing specified for Class 2, ~~Class~~ 2R, ~~Class~~ 3, and ~~Class~~ 3R ensembles shall be limited to the testing specified in 7.1.2.2 and the following chemicals:

(a) Acrylonitrile

(b) Ammonia

(c) Dimethyl sulfate

(3) With the exception of chemical permeation testing, a total of two specimens shall be permitted for ensemble material and component testing requirements. If the testing is specified for both directions of a material, a total of two specimens per material direction shall be permitted for testing requirements.

4.5 Manufacturers' Quality Assurance Program.

4.5.1

The manufacturer shall provide and operate a quality assurance program that meets the requirements of this section and that includes a product recall system as specified in 4.2.7.1 and Section 4.8.

4.5.2

The operation of the quality assurance program shall evaluate and test compliant product production against this standard to ~~assure~~ ensure production remains in compliance.

4.5.3

All of the following entities shall be registered to ISO 9001, *Quality management systems — Requirements*, or shall be listed as ~~a~~ covered locations under an ISO 9001-registered entity:

(1) Manufacturer

(2) Manufacturing facility

(3) Entity that directs and controls compliant product design

(4) Entity that directs and controls compliant product quality assurance

(5) Entity that provides the warranty for the compliant product

(6) Entity that puts their name on the product label and markets and sells the product as their own

4.5.3.1

Registration based on the requirements of ISO 9001 shall be conducted by a registrar that is accredited for personal protective equipment in accordance with ISO/IEC 17021, *Conformity assessment — Requirements for bodies providing audit and certification of management systems* . The registrar shall affix the accreditation mark on the ISO registration certificate.

4.5.4*

Where the manufacturer uses subcontractors in the construction or assembly of the compliant product, the locations and names of all the subcontractor facilities shall be documented and the documentation shall be provided to the manufacturer's ISO registrar and the certification organization.

4.6 Hazards Involving Compliant Product.

4.6.1*

The certification organization shall establish procedures to be followed where situation(s) are reported in which a compliant product is subsequently found to be hazardous. These procedures shall comply with the provisions of ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, and as modified herein.

A.4.6.1

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity,* is a component of accreditation of certification organizations specified in 4.1.3 and 4.2.3 and of this standard. Those paragraphs contain a mandatory reference to ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services,* in which ISO Guide 27 is referenced.

4.6.2*

Where a report of a hazard ~~involved with~~ related to a compliant product is received by the certification organization, the validity of the report shall be investigated.

4.6.3

With respect to a compliant product, a hazard shall be a condition, or shall create a situation, that results in exposing life, limb, or property to an imminently dangerous or dangerous condition.

4.6.4

Where a specific hazard is identified, the determination of the appropriate action for the certification organization and the manufacturer to undertake shall take into consideration the severity of the hazard and its consequences to the safety and health of users.

4.6.5

Where it is established that a hazard is ~~involved with~~ related to a compliant product, the certification organization shall determine the scope of the hazard, including the products, model numbers, serial numbers, factory production facilities, production runs, and quantities involved.

4.6.6

The certification organization's investigation shall include, but not be limited to, the extent and scope of the problem as it might apply to other compliant products or compliant product components manufactured by other manufacturers or certified by other certification organizations.

4.6.7

The certification organization shall also investigate reports of a hazard where a compliant product is gaining widespread use in applications not foreseen when the standard was written~~,~~ ; such applications, in turn, ~~being~~ are ones for which the product was not certified, ~~and~~ where there is no specific scope of application ~~has been~~ provided in the standard, and where there is no limiting scope of application ~~was~~ provided by the manufacturer in written material accompanying the compliant product at the point of sale.

4.6.8

The certification organization shall require the manufacturer of the compliant product or product component, if applicable, to assist the certification organization in the investigation and to conduct its own investigation as specified in Section 4.7.

4.6.9

Where the facts indicating a need for corrective action are conclusive and the certification organization's appeal procedures referenced in 4.2.11 have been followed, the certification organization shall initiate corrective action immediately, provided there is a manufacturer to be held responsible for such action.

4.6.10

Where the facts are conclusive and corrective action is indicated~~,~~ but there is no manufacturer to be held responsible, such as when the manufacturer is out of business or the manufacturer is bankrupt, the certification organization shall immediately notify relevant governmental and regulatory agencies and issue a notice to the user community about the hazard.

4.6.11*

Where the facts are conclusive and corrective action is indicated, the certification organization shall take one or more of the following corrective actions:

(1) Notification of parties authorized and responsible for issuing a safety alert when, in the opinion of the certification organization, such a notification is necessary to inform ~~the~~ users

(2) Notification of parties authorized and responsible for issuing a product recall when, in the opinion of the certification organization, such a recall is necessary to protect ~~the~~ users

(3) Removal of the mark of certification from the product

(4) Where a hazardous condition exists and it is not practical to implement 4.6.11(1), 4.6.11(2), or 4.6.11(3), or the responsible parties refuse to take corrective action, notification of relevant governmental and regulatory agencies and issuance of a notice to the user community about the hazard

4.6.12

The certification organization shall provide a report to the organization or individual identifying the reported hazardous condition and notify them of the corrective action ~~indicated,~~ <u>taken</u> or that no corrective action is indicated.

4.6.13*

Where a change to an NFPA standard(s) is felt to be necessary, the certification organization shall also provide a copy of the report and corrective actions indicated to the NFPA, and <u>it</u> shall also submit either a Public Input for a proposed change to the next revision of the applicable standard or a proposed Temporary Interim Amendment (TIA) to the current edition of the applicable standard.

4.7 Manufacturers' Investigation of Complaints and Returns.

4.7.1

Manufacturers shall provide corrective action in accordance with ISO 9001~~, *Quality management systems — Requirements*~~ <u>,</u> or an equivalent ISO quality management system for investigating written complaints and returned products. ~~*(See also A.4.6.3.)*~~

4.7.2

Manufacturers' records of returns and complaints related to safety issues shall be retained for at least 5 years.

4.7.3

Where the manufacturer discovers, during the review of specific returns or complaints, that a compliant product or compliant product component ~~can~~ <u>might</u> constitute a potential safety risk to end users that is possibly subject to a safety alert or product recall, the manufacturer shall immediately contact the certification organization and provide all <u>the</u> information about their review to assist the certification organization with their investigation.

4.8 Manufacturers' Safety Alert and Product Recall Systems.

4.8.1

Manufacturers shall establish a written safety alert system and a written product recall system that describes the procedures to be used in the event that it decides, or is directed by the certification organization, to either issue a safety alert or conduct a product recall.

4.8.2

The manufacturers’ safety alert and product recall system shall provide the following:

(1) The establishment of a coordinator and responsibilities by the manufacturer for the handling of safety alerts and product recalls

(2) A method of notifying all dealers, distributors, purchasers, users, and the NFPA about the safety alert or product recall that can be initiated within a 1-week period following the manufacturer’s decision to issue a safety alert or conduct a product recall~~;~~ or after the manufacturer has been directed by the certification organization to issue a safety alert or conduct a product recall

(3) Techniques for communicating accurately and understandably the nature of ~~the~~ a safety alert or product recall and, in particular, the specific hazard or safety issue found to exist

(4) Procedures for removing product that is recalled and documenting the effectiveness of the product recall

(5) A plan for either repairing, replacing, or compensating purchasers for returned product

~~**4.5** Administration Specific to NFPA 1994.~~

~~**4.5.1** Scope Specific to NFPA 1994.~~

~~**4.5.1.1***~~

~~This standard shall establish requirements for protective ensembles and ensemble elements that are worn for a single exposure at incidents involving hazardous materials and CBRN terrorism agents.~~

~~**4.5.1.2**~~

~~This standard shall also establish requirements for ruggedized ensembles that can be used multiple times where there is no exposure to hazardous materials and CBRN terrorism agents and that provide a greater level of physical hazard resistance and increased durability.~~

~~**4.5.1.2.1**~~

~~This standard shall also establish additional optional requirements for hazardous materials and CBRN protective ensembles for escape protection only from chemical flash fires encountered during hazardous materials and CBRN incidents.~~

~~**4.5.1.2.2**~~

~~This standard shall also establish additional optional requirements for hazardous materials and CBRN protective ensembles addressing stealth characteristics of ensembles.~~

~~**4.5.1.3**~~

~~This standard shall establish requirements for new hazardous materials and CBRN protective ensembles and ensemble elements.~~

~~**4.5.1.4**~~

~~This standard shall not establish requirements for respiratory protection for incidents involving hazardous materials or CBRN terrorism agents. Appropriate respiratory protection for the incidents involving specific hazardous materials or CBRN terrorism agent exposure is a critical part of overall protection and shall be specified and provided by the authority having jurisdiction.~~

~~**4.5.1.5**~~

~~This standard shall not establish requirements for any fire-fighting applications.~~

~~**4.5.1.6***~~

~~This standard shall not establish requirements for protection at incidents involving ionizing radiation, liquefied gas, cryogenic liquid hazards, explosives, or explosive atmospheres.~~

~~**4.5.1.7**~~

~~This standard shall not apply to any accessories that could be attached to the certified product, before or after purchase, but are not necessary for the certified product to meet the requirements of this standard.~~

~~**4.5.1.8**~~

~~This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant hazardous materials and CBRN protective ensembles and ensemble elements. It shall be the responsibility of the persons and organizations that use compliant hazardous materials and CBRN protective ensembles and ensemble elements to establish safety and health practices and to determine the applicability of regulatory limitations prior to use.~~

~~**4.5.1.9**~~

~~This standard shall not be construed as addressing all of the safety concerns, if any, associated with the use of this standard by testing facilities. It shall be the responsibility of the persons and organizations that use this standard to conduct testing of hazardous materials and CBRN protective ensembles and ensemble elements to establish safety and health practices and to determine the applicability of regulatory limitations prior to using this standard for any designing, manufacturing, and testing.~~

~~**4.5.2** Purpose Specific to NFPA 1994.~~

~~**4.5.2.1**~~

~~To achieve this purpose, this standard shall establish minimum requirements for hazardous materials and CBRN protective ensembles and ensemble elements for emergency first responder personnel responding to incidents involving hazardous materials and CBRN terrorism agents, and for emergency first responder personnel exposed to victims or materials during assessment, extrication, rescue, triage, decontamination, treatment, site security, crowd management, and force protection operations at incidents involving hazardous materials and CBRN terrorism agents.~~

~~**4.5.2.2**~~

~~This standard shall provide emergency first responder personnel with four levels of hazardous materials and CBRN protective ensembles and ensemble elements that could be selected for minimum protection of emergency first responder personnel based on what the incident risk analysis indicates is necessary protection for the intended operations.~~

~~**4.5.2.3**~~

~~This standard shall establish a level of physical hazard resistance for three of the four levels of CBRN ensembles and ensemble elements that could be selected for those operations where ensembles are used multiple times without exposure to hazardous materials and CBRN terrorism agents and for operations requiring increased durability.~~

~~**4.5.2.4**~~

~~This standard shall establish a minimum level of limited chemical flash fire protection for escape only in the event of a chemical flash fire, as an option for compliant CBRN protective ensembles and ensemble elements.~~

~~**4.5.2.5**~~

~~This standard shall establish a minimum level of stealth characteristics, as an option for compliant CBRN ensembles.~~

~~**4.5.3** Application Specific to NFPA 1994.~~

~~**4.5.3.1**~~

~~The requirements for Class 1 hazardous materials and CBRN protective ensembles and ensemble elements shall apply to ensembles designed to provide protection to emergency first responder personnel at incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).~~

~~**4.5.3.2**~~

~~The requirements for Class 2 hazardous materials and CBRN protective ensembles and ensemble elements shall apply to ensembles designed to provide limited protection to emergency first responder personnel at hazardous materials or terrorism incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).~~

~~**4.5.3.3**~~

~~The requirements for Class 3 hazardous materials and CBRN protective ensembles and ensemble elements shall apply to ensembles designed to provide limited protection to emergency first responder personnel at hazardous materials or terrorism incidents involving low levels of vapor or liquid chemical hazards, where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR).~~

~~**4.5.3.4**~~

~~The requirements for Class 4 hazardous materials and CBRN protective ensembles and ensemble elements shall apply to ensembles designed to provide limited protection to emergency first responder personnel at terrorism incidents involving particulate hazards, including biological hazards or radiological particulate hazards, where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR).~~

~~**4.5.3.5**~~

~~This standard shall apply to the design, manufacturing, and certification processes for *new* hazardous materials and CBRN protective ensembles and ensemble elements for incidents involving CBRN terrorism agents.~~

~~**4.5.3.6**~~

~~This edition of NFPA 1994 shall not apply to any CBRN protective ensembles and ensemble elements manufactured to prior editions of this standard.~~

~~**4.5.3.7**~~

~~This standard shall not apply to any hazardous materials or CBRN protective ensembles and ensemble elements for incidents involving hazardous materials or CBRN terrorism incidents, which are manufactured in accordance with other specifications or the standards of other organizations.~~

~~**4.5.3.8**~~

~~This standard shall not apply to use requirements for hazardous materials and CBRN protective ensembles and ensemble elements for incidents involving hazardous materials or CBRN terrorism agents, as these requirements are specified in NFPA 1500 .~~

~~**4.5.4** Annual Verification Specific to NFPA 1994.~~

~~**4.5.4.1** Annual Verification of Product Compliance Specific to NFPA 1994.~~

~~**4.5.4.1.1**~~

~~All products that are labeled as being compliant with this standard shall undergo recertification on an annual basis.~~

~~**4.5.4.1.1.1**~~

~~This recertification shall include inspection and evaluation to the design requirements and testing to the performance requirements as required by this standard on all manufacturers' compliant product models.~~

~~**4.5.4.1.1.2**~~

~~Any change that affects the compliant product performance under design or performance requirements of this standard shall constitute a different model.~~

~~**4.5.4.1.1.3**~~

~~For the purpose of this standard, models shall include each unique pattern, style, or design of the compliant products.~~

~~**4.5.4.1.2**~~

~~Samples of manufacturer's models and components for recertification shall be acquired from the manufacturer or component supplier during random and unannounced visits as part of the follow-up program specified in 4.1.4 .~~

~~**4.5.4.1.2.1**~~

~~For recertification, the certification organization shall acquire at least one complete compliant product.~~

~~**4.5.4.1.2.2**~~

~~The certification organization shall also acquire a sufficient quantity of components to be tested for recertification as required by 4.4.4.1.3 .~~

~~**4.5.4.1.3**~~

~~Compliant products and components shall be inspected, evaluated, and tested as specified in 4.4.4.1.3 and 4.4.4.1.3.2 . Inspection, evaluation, and testing performed as part of the follow-up program shall be permitted to be used for recertification to avoid duplication.~~

~~**4.6.4.1.4**~~

~~The manufacturer shall maintain all design, inspection, performance, and test data from the certification organization produced during the recertification of manufacturers' models and components. The manufacturer shall provide such data, on request, to the purchaser or to the authority having jurisdiction.~~

Supplemental Information

File Name	Description	Approved
1990_SR_73_ch._4.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Nov 05 13:59:14 EST 2020

Committee Statement

Committee Statement: With the removal of NFPA 1999 from this document, the scope, purpose, and application were moved from chapter 4 to chapter 1. Chapter 4 has been reorganized with the relocation of the scope, purpose, and application. In both chapters, terminology has been revised for consistency and clarity and references have been corrected based on the revision.

Response Message: SR-73-NFPA 1990-2020

Public Comment No. 252-NFPA 1990-2020 [Section No. 4.4.4.1.3 [Excluding any Sub-Sections]]

Public Comment No. 149-NFPA 1990-2020 [Section No. 4.3.4.1.1.1]

Public Comment No. 28-NFPA 1990-2020 [Section No. 4.2.4.1.3.3]

Public Comment No. 138-NFPA 1990-2020 [Section No. 4.1.6.1]

Public Comment No. 140-NFPA 1990-2020 [Section No. 4.1.6.3 [Excluding any Sub-Sections]]

Public Comment No. 152-NFPA 1990-2020 [Section No. 4.3.4.1.3 [Excluding any Sub-Sections]]

Public Comment No. 155-NFPA 1990-2020 [Section No. 4.4.4.1.1 [Excluding any Sub-Sections]]

Public Comment No. 150-NFPA 1990-2020 [Section No. 4.3.4.1.1.2]
Public Comment No. 130-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 261-NFPA 1990-2020 [Section No. 4.3.4.1.2]
Public Comment No. 167-NFPA 1990-2020 [Section No. 4.1.6.4]
Public Comment No. 163-NFPA 1990-2020 [Section No. 4.4.4.1.3.1]
Public Comment No. 128-NFPA 1990-2020 [Section No. 4.4.3.8]
Public Comment No. 63-NFPA 1990-2020 [Section No. 4.1.3.1]
Public Comment No. 169-NFPA 1990-2020 [Section No. 4.1.9.1]
Public Comment No. 131-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 165-NFPA 1990-2020 [Sections 4.1.4.8, 4.1.4.9, 4.1.4.10]
Public Comment No. 156-NFPA 1990-2020 [Section No. 4.4.4.1.1.1]
Public Comment No. 251-NFPA 1990-2020 [Section No. 4.4.4.1.2 [Excluding any Sub-Sections]]
Public Comment No. 256-NFPA 1990-2020 [Section No. 4.1.4.8]
Public Comment No. 147-NFPA 1990-2020 [Section No. 4.2.4.1.4]
Public Comment No. 136-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 139-NFPA 1990-2020 [Section No. 4.1.6.2 [Excluding any Sub-Sections]]
Public Comment No. 157-NFPA 1990-2020 [Section No. 4.4.4.1.1.2]
Public Comment No. 164-NFPA 1990-2020 [Section No. 4.4.4.1.4]
Public Comment No. 260-NFPA 1990-2020 [Section No. 4.3.4.1.1 [Excluding any Sub-Sections]]
Public Comment No. 257-NFPA 1990-2020 [Section No. 4.1.4.9]
Public Comment No. 141-NFPA 1990-2020 [Section No. 4.1.6.3.5]
Public Comment No. 154-NFPA 1990-2020 [Section No. 4.3.4.1.4]
Public Comment No. 151-NFPA 1990-2020 [Section No. 4.3.4.1.2]
Public Comment No. 166-NFPA 1990-2020 [Section No. 4.1.4.1]
Public Comment No. 134-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 162-NFPA 1990-2020 [Section No. 4.4.4.1.3 [Excluding any Sub-Sections]]
Public Comment No. 262-NFPA 1990-2020 [Section No. 4.3.4.1.3.3]
Public Comment No. 5-NFPA 1990-2020 [Chapter 4 [Title Only]]
Public Comment No. 133-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 137-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 132-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 173-NFPA 1990-2020 [Section No. 4.1.5.9]
Public Comment No. 135-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 264-NFPA 1990-2020 [Section No. 4.4.4.1.3]
Public Comment No. 144-NFPA 1990-2020 [Section No. 4.2.4.1.1]
Public Comment No. 255-NFPA 1990-2020 [Section No. 4.1.1.1]
Public Comment No. 143-NFPA 1990-2020 [New Section after 4.1.5.9]
Public Comment No. 174-NFPA 1990-2020 [Section No. 4.1.7.3]
Public Comment No. 24-NFPA 1990-2020 [Section No. 4.1.3.1]
Public Comment No. 146-NFPA 1990-2020 [Section No. 4.2.4.1.3.1]
Public Comment No. 145-NFPA 1990-2020 [Section No. 4.2.4.1.2]

Public Comment No. 258-NFPA 1990-2020 [Section No. 4.1.4.10]

Public Comment No. 263-NFPA 1990-2020 [Section No. 4.4.4.1.2 [Excluding any Sub-Sections]]

Public Comment No. 153-NFPA 1990-2020 [Section No. 4.3.4.1.3.1]

Public Comment No. 171-NFPA 1990-2020 [Section No. 4.2.3.2]

Public Comment No. 159-NFPA 1990-2020 [Section No. 4.4.4.1.2 [Excluding any Sub-Sections]]

Public Comment No. 158-NFPA 1990-2020 [Section No. 4.4.4.1.1.3]

Public Comment No. 160-NFPA 1990-2020 [Section No. 4.4.4.1.2.1]

Public Comment No. 148-NFPA 1990-2020 [Section No. 4.3.4.1.1 [Excluding any Sub-Sections]]

Public Comment No. 161-NFPA 1990-2020 [Section No. 4.4.4.1.2.2]

Public Comment No. 25-NFPA 1990-2020 [Section No. 4.1.4.4]

Public Comment No. 129-NFPA 1990-2020 [Section No. 4.1.5.9]

Public Comment No. 26-NFPA 1990-2020 [Section No. 4.2.4.1.1 [Excluding any Sub-Sections]]

Ballot Results

✔ This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Fithian, William A.

Several edits are required: Section 4.3.1 - "recertification" needs to be revised to "annual verification" to be consistent with similar changes made within Chapter 4.; Section 4.4.3.2 (1) - remove "then" to be consistent with similar changes made within Chapter 4.; Section 4.4.2.3 (1) reference needs to be changed from 7.1.2.1 to 7.2.2; Section 4.4.2.3 (3) reference needs to be changed from 7.1.2.5 to 7.2.3; Section 4.4.3.3 references 8.3.2; 8.3.3; 8.3.4 should be replaced by 7.3.2; Section 4.4.4.3 (1) reference needs to be changed from 7.1.2.2 to 7.4.2; Section 4.4.4.3 (2) reference needs to be changed from 7.1.2.2 to 7.4.3

Second Revision No. 26-NFPA 1990-2020 [Chapter 5 [Title Only]]

Labeling and Information ~~(NFPA 1991, NFPA 1992, and NFPA 1994)~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:04:12 EDT 2020

Committee Statement

Committee Statement: No longer necessary since NFPA 1999 is being removed.
Response Message: SR-26-NFPA 1990-2020

Public Comment No. 6-NFPA 1990-2020 [Chapter 5 [Title Only]]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 168-NFPA 1990-2021 [Section No. 5.1.1.6]

5.1.1.6

All letters and numbers on the product label(s) and product package label(s) shall meet the following requirements ~~(see also A.4.2.2)~~ :

(1) The compliance statements in 5.2.1.1, 5.3.1.1, 5.3.1.2, 5.3.1.3, 5.3.1.4, 5.3.1.5, 5.3.1.6, 5.4.1.1, 5.4.1.2, and 5.4.1.3 shall be at least 2.5 mm (3⁄32 in.) high.

(2) The certification organization's symbol shall be at least 6 mm (1⁄4 in.) high.

(3) The certification organization's name shall be at least 2.5 mm (3⁄32 in.) high.

(4) All other labeling information shall be at least 1.6 mm (1⁄16 in.) high.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Wed Jan 20 11:02:55 EST 2021

Committee Statement

Committee Statement: Removing reference to annex section.
Response Message: SR-168-NFPA 1990-2021

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 82-NFPA 1990-2020 [Section No. 5.1.1.7]

5.1.1.7

In addition to the compliance statements specified in 5.1.1.6(1), ~~at least~~ the following information at a minimum, shall also be printed legibly on the product label(s):

(1) Manufacturer's name, identification, or designation

(2) Manufacturer's address

(3) Country of manufacture

(4) Model, style, or serial number

(5) Size

(6) The word(s) "garment," "visor," "hood," "glove," or "ensemble element," as applicable

(7) For ensembles, the words "glove element component," "footwear element component," or "hood element component," as applicable

(8) Where the product is classified as breathable, the words "breathable (see manufacturer's technical data package)" as required by ~~16.2.7~~ 7.1.3.6

(9) For NFPA 1991-compliant ensembles, the date and result (ending pressure) of compliance testing to ASTM F1052, *Standard Test Method for Pressure Testing Vapor Protective* ~~*Ensembles*~~ *Suits*

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 08:15:55 EST 2020

Committee Statement

Committee Statement: Correcting section reference.

Response Message: SR-82-NFPA 1990-2020

Public Comment No. 43-NFPA 1990-2020 [Section No. 5.1.1.7]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Fithian, William A.

Need to add the following: (10) Where the ensemble is classified as meeting the optional Stealth Performance, the audible signature in dBA shall be reported as required by 7.1.9.2.

Second Revision No. 91-NFPA 1990-2020 [Section No. 5.1.2.3]

Global SR-133

5.1.2.3

The manufacturer shall provide at least the following instructions and information with each ensemble and ensemble element:

(1) Pre-use information, as follows:

(a) Safety considerations

(b) Limitations of use

(c) Ensemble or ensemble element marking recommendations and restrictions

(d) A statement that most performance properties of the ensemble or ensemble element cannot be tested by the user in the field

(e) Closure lubricants, where applicable

(f) Visor antifog agents or procedures, where applicable

(g) Recommended undergarments

(h) Warranty information

(i) For ~~liquid splash~~NFPA 1992-certified ensembles and NFPA 1994-certified ensembles, the following:

i. A specific warning for nonencapsulated ensembles that the ~~respiratory equipment~~respirator has not been evaluated for chemical permeation resistance consistent with the other ensemble elements

ii. A specific warning not to use tape as a means for creating interfaces between ensemble elements

(j) A statement that the AHJ comply with the requirements of NFPA 1891 for the selection, care, and maintenance of protective ensemble and elements

(2) Storage information, as follows:

(a) Recommended practices

(b) Recommended conditions

(c) Storage life for all ensembles and ensemble elements

(3) Donning/doffing information, as follows:

(a) Donning and doffing procedures

(b) Sizing and adjustment procedures

(c) Ensemble interface attachment(s) and issues

(d) Respirator interface with ensemble

(e) Where applicable, procedures for ensuring that the interface of the ~~respiratory equipment~~respirator is maintained during use

(f) * Where applicable, procedures for completing interfaces with detachable components

A.5.1.2.3(3)(f)

Detachable components include, but ~~aren't~~are not limited to, gloves, boots, and overcovers.

(g) Where applicable, instructions for removal of hands from gloves and reinsertion of hands into gloves

(h) Specific instructions for doffing when contaminated

(4) Proper use information, as follows:

(a) A statement requiring users to comply with NFPA 1500™

(b) For users in the United States, a statement requiring users to comply with 29 CFR 1910.132, "Personal Protective Equipment: General Requirements"

(c) For users in other countries, a statement requiring users to comply with national or other applicable personal protective equipment regulations

(d) ~~Decontamination procedures for both chemical and biological contamination~~ If applicable, a statement indicating that the ensembles or ensemble elements are for single use only

(e) Instructions for removal and replacement of gloves and other user-replaceable components

(5) Cleaning and maintenance information, as follows:

(a) Cleaning instructions and precautions with a statement instructing users not to use ensembles or ensemble elements that are not thoroughly cleaned and dried

(b) Inspection frequency details

(c) Where applicable, maintenance criteria and methods of repair

(d) Decontamination procedures for both chemical and biological contamination

(e) Instructions for removal and replacement of gloves and other user-replaceable components

(6) Retirement and disposal criteria and consideration

(7) For ~~liquid splash protective ensembles,~~ nonencapsulating ensembles where a respirator is required, the make and model of the respirator used to achieve compliance ~~with the requirements of this standard~~

(8)* For ~~vapor protective~~ NFPA 1991-certified ensembles, the words "The closure has not been tested for permeation resistance"

A.5.1.2.3(8)

~~Currently~~ In the past, garment closures ~~are~~ were not evaluated for chemical permeation resistance as specified for garment material, seams, and other ensemble ~~materials. Garment~~ elements. Currently, garment closures are tested for chemical penetration resistance, which ~~only~~ assesses whether liquid will visibly penetrate through ~~the~~ a closure after a 1-hour exposure, with part of that exposure conducted under an elevated pressure [13.8 kPa (2 psi)]. Current technology does not permit closures that ~~will~~ meet the same chemical permeation resistance criteria applied to garments and other ~~element~~ materials and seams. ~~In addition to the chemical penetration resistance testing against liquid chemicals, manufacturers are~~ Manufacturers are also required to design their ensembles with a flap that covers the closure portion of the garment to minimize the effects of liquid splash.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 08:48:53 EST 2020

Committee Statement

Committee Statement: Corrections were made to address other changes in the consolidated standard made during second draft and to provide a reference to NFPA 1891 that was developed in parallel with the revision of the standard. The requirement for manufacturers to designate ensembles or ensemble elements as single use was also added.

Response Message: SR-91-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 93-NFPA 1990-2020 [Section No. 5.1.3]

5.1.3 General Technical Data Package Requirements. ~~(Reserved)~~

5.1.3.1*

The manufacturer shall designate if the ensemble or ensemble elements are for single use only and provide guidance on what constitutes a single use, if indicated.

A.5.1.3.1

Some manufacturers might consider their ensembles to be disposable after a single wearing (or other form of use) and should indicate this intended ensemble or element limitation to the purchaser, if warranted. Manufacturers are further required to provide additional information for designating an ensemble or element as single use in terms of the specific factors that are to be taken into consideration when defining an ensemble or element as single use *(see A.3.3.84 , Single-Use Item).*

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 09:14:23 EST 2020

Committee Statement

Committee Statement: Performance requirements in the standard are primarily predicated on single exposure, but could also constitute a single use based on the ruggedness of the gear. The additional reporting requirement was incorporated to allow for manufacturers to indicate that their ensembles or ensemble elements should not be reused.

Response Message: SR-93-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 144-NFPA 1990-2020 [Section No. 5.2.3.1.2]

Global SR-143

5.2.3.1.2*

The technical data package shall contain all documentation required by this standard and the values obtained from the initial certification showing compliance with the requirements of Chapter 7 in the current edition of this standard using the reporting formats provided in Table 5.2.3.1.2(a) and Table 5.2.3.1.2(b)and by indicating “Pass” for those requirements that have no reported quantitative values and “Not applicable” for specific requirements that do not apply to the vapor-protective ensemble.

Table 5.2.3.1.2(a) Format for Reporting NFPA 1991-Specific Certification Test Data in Technical Data Package

Ensemble or Ensemble Element	**Performance Requirement**	**Test Method**	**Requirement**	**Result**
Base Requirements				
Ensemble	Overall inward leakage	Section 8.2.2.2	$PPDF_{sys}$ ≥488	
			$PPDF_{i}$ (local) ≥1071	Indicate lowest average value and its location
	Liquidtight integrity	ASTM F1359/F1359M (Section ~~8.3~~8.2.3)	No liquid penetration	
			No liquid accumulation in outer gloves	
			No liquid accumulation in outer boots	
			No liquid inside ensemble next to exhaust valves	
	Overall ensemble function and integrity	ASTM F1154/ASTM F1052 (Section ~~8.4~~8.6.1)	Ending ~~suit~~garment pressure ≥80 mm (~~3.15~~3 5/32 in.) water gauge	
			Test subject completes tasks within 30 minutes	
			Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)	
			Test subject has visual acuity of 20/35 or better through facepiece lens and visor	
			Test subject identifies three of four letters on test sign	
			Time to remove hands from and reinsert hands ~~in gloves 5~~into gloves five times ≤2.5 minutes	
			Garment closures remain engaged	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
			Protective flap stays remain closed	
	Airflow capacity	Section ~~8.5~~8.6.2	Internal ~~suit~~garment pressure ≤150 mm (~~5.9~~6 in.) water gauge	
			Ending ~~suit~~garment pressure ≥80 mm (3 5/32 in.) water gauge	
	~~Overall inward leakage~~	~~Section 8.8~~	~~$PPDF_{sys}$ ≥ 488~~	~~[indicate lowest average value and its location]~~
				~~$PPDF_i$ (local) ≥ 1071~~
Exhaust valve	Inward leakage	Section 8.6.3	Leakage rate ≤30 mL/min (1.83 in^3/min)	
	Mounting strength	Section ~~8.9~~8.5.4	Strength >135 N (30~~.35~~ lbf)	
	~~Inward leakage~~	~~Section 8.24~~	~~Leakage rate ≤ 30 mL/min (1 oz/min)~~	
External fitting	Installation effect on integrity	ASTM F1052 (Section 8.2.1)	Ending ~~suit~~garment pressure ≥80 mm (3 ~~15~~5/32 in.) water gauge	
	Pull-out strength (tethered applications)	Section ~~8.13~~8.5.5	Strength >1000 N (~~224.8~~225 lbf)	
	Pull-out strength (non-tethered applications)	Section 8.5.5	Strength >1000 N (225 lbf)	
Garment material	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m^2 (1 hour); ≤0.43 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
~~Suit material~~	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			No melting and dripping	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
	Burst strength	ASTM D751 (Section ~~8.10~~8.5.1)	Strength >200 N (45 lbf)	
	Puncture propagation tear resistance	ASTM D2582 (Section ~~8.11~~8.5.2)	Tear resistance ≥49 N (11 lbf)	
	Cold temperature ~~performance~~bending	ASTM D747 (Section ~~8.12~~8.5.11.1)	Bend moment ≤0.057 N·m (0.5 in.-lb)	
Garment seam	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 μg/m^2 (1 hour); ≤2.0 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m^2 (1 hour); ≤1.33 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m^2 (1 hour); ≤0.43 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
~~Suit seam~~	~~Breaking~~Seam strength	ASTM D751 (Section ~~8.22~~8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	
~~Suit~~Garment closure	Chemical penetration resistance	ASTM F903 (Section ~~8.23~~8.3.3)	No penetration of 15 liquid chemicals	
	~~Breaking~~Closure strength	ASTM D751 (Section ~~8.22~~8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	
Visor material	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 μg/m^2 (1 hour); ≤2.0 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m^2 (1 hour); ≤1.33 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m^2 (1 hour); ≤0.43 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			No melting and dripping	
	Visor high-mass impact resistance	Section ~~8.29~~8.5.10	No full-thickness cracks, holes, or fractures	
	Cold temperature ~~bend~~bending	Section ~~8.14~~8.5.11.2	No cracking or evidence of visual damage	
Visor seam	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 μg/m^2 (1 hour); ≤2.0 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m^2 (1 hour); ≤1.33 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m^2 (1 hour); ≤0.43 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
~~Visor seam~~	~~Breaking~~Seam strength	ASTM D751 (Section ~~8.22~~8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	
Elastomeric interface material	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 μg/m^2 (1 hour); ≤2.0 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m^2 (1 hour); ≤1.33 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m^2 (1 hour); ≤0.43 μg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Elongation	Method A of ASTM D412 (Section 8.5.6)	Elongation at rupture ≥125 percent	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 50 grams (0.8 in. at 1.76 oz)	
	Puncture resistance	Method A of ASTM F1342/F1342M (Section 8.5.8.1)	Puncture force ≥22 N (5 lbf)	
	Ultimate tensile strength	Method A of ASTM D412 (Section 8.5.6)	Strength ≥4 MPa	
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bend moment ≤0.057 N·m (0.5 in.-lb)	
Gloves	Dexterity	ASTM F2010/F2010M (Section 8.6.5)	Percent increase in bare-handed control <600 percent	
Glove material	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 $\mu g/m^2$ (1 hour); ≤2.0 $\mu g/m^2$ (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 $\mu g/m^2$ (1 hour); ≤1.33 $\mu g/m^2$ (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 $\mu g/m^2$ (1 hour); ≤0.43 $\mu g/m^2$ (first 15 minutes)	See Table 5.2.3.1.2(b)
	~~Breaking strength~~	~~ASTM D751 (Section 8.22)~~	~~Strength >67 N/25 mm~~	
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds No melting	
	Cut resistance	ASTM F1790 (Section ~~8.15~~8.5.7)	Blade travel distance ≥20 mm at 150 grams (0.8 in. at ~~5.3~~5.29 oz)	
	Puncture resistance	Method A of ASTM F1342/F1342M (Section ~~8.16~~8.5.8.1)	Puncture force ≥22 N (~~4.95~~5 lbf)	
	Cold temperature ~~performance~~bending	ASTM D747 ~~(Section 8.12)~~	Bend moment ≤0.057 N·m (0.5 in.-lb)	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
~~Gloves~~	~~Dexterity~~	~~ASTM F2010/F2010M (Section 8.17)~~	~~Percent increase in bare handed control < 600 percent~~	
Footwear	Impact, compression, and sole puncture resistance	ASTM F2412	Footwear meets ASTM F2413 criteria	
Footwear upper material	Chemical permeation resistance	ASTM F739 (Section 8.3.1.1)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m^2 (1 hour); ≤0.43 µg/m^2 (first 15 minutes)	See Table 5.2.3.1.2(b)
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds No melting and dripping	
	Cut resistance	ASTM F1790 (Section ~~8.15~~8.5.7)	Blade travel distance ≥20 mm at 350 grams (0.8 in. at 12.35 oz)	
	Puncture resistance	Method A of ASTM F1342/F1342M (Section ~~8.16~~8.5.8.1)	Puncture force ≥36 N (8.0 lbf)	
~~Footwear toe sections~~	~~Impact resistance~~	~~ASTM F2412 (Section 8.31)~~		~~Minimum clearance of 12.7 mm (0.50 in.) for men's and 11.9 mm (0.468 in.) for women's~~
	~~Compression resistance~~	~~ASTM F2412 (Section 8.31)~~		~~Minimum clearance of 12.7 mm (0.50 in.) for men's and 11.9 mm (0.468 in.) for women's~~
Footwear soles and heels	Abrasion resistance	Method A of ISO 4649 (Section ~~8.19~~8.5.9.2)	Relative volume loss ≤250 mm^3	

Ensemble or Ensemble Element	**Performance Requirement**	**Test Method**	**Requirement**	**Result**
Base Requirements				
	Slip resistance	ASTM F2913 (Section ~~8.21~~8.6.7)	Coefficient ≥0.40	
~~Footwear puncture-resistant device~~	~~Puncture resistance~~	~~ASTM F2412 (Section 8.30)~~	~~No puncture~~	
~~Footwear soles or ladder shanks~~	~~Bending resistance~~	~~Section 8.20~~	~~Deflection ≤ 6 mm~~	
Optional Flash Fire Protection Requirements				
Ensemble	Overall flash fire protection	~~Section 8.25~~ASTM F1930 (Section 8.4.4)	Afterflame time ≤~~2~~5 seconds	
			~~Ending suit pressure ≥ 13 mm water gauge~~	
			Test subject has visual acuity of 20/100 or better through facepiece lens and visor	
			Break-open of material or seam ≤51 mm (2.0 in.)	
			No evidence of dripping	
			Percent second-degree and third-degree body burn area (optional reporting)	
Garment material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	HTP rating ≥ ~~12~~8 cal/cm^2	
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	
			No melting and dripping	
Visor material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	HTP rating ≥ ~~12~~8 cal/cm^2	
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
			No melting and dripping	
Glove material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	HTP rating ≥ ~~12~~8 cal/cm^2	
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	
			No melting and dripping	
Footwear material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	HTP rating ≥12 cal/cm^2	
	Flame resistance	ASTM F1358 (Section ~~8.7~~8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	
Elastomeric interface material	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	
Optional Liquefied Gas Protection Requirements				
Garment material	Liquefied gas permeation resistance	ASTM F739 (Section 8.3.1.1)		See Table 5.2.3.1.2(b)
Visor material	Liquefied gas permeation resistance	ASTM F739 (Section 8.3.1.1)		See Table 5.2.3.1.2(b)
Glove material	Liquefied gas permeation resistance	ASTM F739 (Section 8.3.1.1)		See Table 5.2.3.1.2(b)
Footwear material	Liquefied gas permeation resistance	ASTM F739 (Section 8.3.1.1)		See Table 5.2.3.1.2(b)
Optional Stealth Performance				
Ensemble	Acoustic signature	Section 8.7.2	Report only (dBA)	
Each ensemble material	Color/visibility	Section 8.7.1	Y Brightness <25	
			L* value <55	

~~Table 5.2.3.1.2(b) Format for Reporting NFPA 1991–Specific Certification Permeation Test Data in Technical Data Package~~

~~**Material or Seam Tested**~~	~~**[insert material or seam description]**~~

~~**Material or Seam Tested**~~	~~**[insert material or seam description]**~~				
~~**Test Period Interval**~~	~~**Cumulative Permeation (µg/cm²) Over Test Period Interval**~~				
	~~**0–15 min**~~	~~**15–30 min**~~	~~**30–45 min**~~	~~**45–60 min**~~	~~**1 hour**~~
~~**Test Period Interval**~~	~~**Cumulative Permeation (µg/cm²) Over Test Period Interval**~~				
	~~**0–15 min**~~	~~**15–30 min**~~	~~**30–45 min**~~	~~**45–60 min**~~	~~**1 hour**~~
~~**Chemical/Requirement**~~	~~≤2.0~~	~~≤2.0~~	~~≤2.0~~	~~≤2.0~~	~~≤6.0~~
~~Acetone~~					
~~Acetonitrile~~					
~~Acrolein~~					
~~Acrylonitrile~~					
~~Anhydrous ammonia (gas)~~					
~~1,3-Butadiene (gas)~~					
~~Carbon disulfide~~					
~~Chlorine (gas)~~					
~~Dichloromethane~~					
~~Diethyl amine~~					
~~Dimethylformamide~~					
~~Dimethyl sulfate~~					
~~Ethyl acetate~~					
~~Ethylene oxide (gas)~~					
~~Hexane~~					
~~Hydrogen chloride (gas)~~					
~~Methanol~~					
~~Methyl chloride (gas)~~					
~~Nitrobenzene~~					
~~Sodium hydroxide, 50% w/w~~					
~~Sulfuric acid, 96.1% w/w~~					
~~Tetrachloroethylene~~					
~~Tetrahydrofuran~~					
~~***Chemical Warfare Agents***~~					
~~**Blister Agent Requirements**~~	~~≤1.33~~	~~≤1.33~~	~~≤1.33~~	~~≤1.33~~	~~≤4.00~~
~~Distilled Mustard~~					
~~**Nerve Agent Requirements**~~	~~≤0.40~~	~~≤0.40~~	~~≤0.40~~	~~≤0.40~~	~~≤1.25~~
~~Soman~~					
~~**Optional Liquefied Gases***~~	~~≤6.0~~				~~≤6.0~~
~~Ammonia (liquefied)~~					
~~Chlorine (liquefied)~~					
~~Ethylene oxide (liquefied)~~					

~~*Liquefied chemical gases are only evaluated over 15-minute exposure period.~~

Table 5.2.3.1.2(b) Format for Reporting NFPA 1991-Specific Certification Permeation Test Data in Technical Data Package

Material or Seam Tested	[insert material or seam description] [a]	
-	Cumulative Permeation ($\mu g/cm^2$) Over Test Period Interval	
Test Period Interval	0–15 min	0–1 hour
Base Chemicals	≤2.0	≤6.0
Acetone		
Acetonitrile		
Acrolein		
Acrylonitrile		
Anhydrous ammonia (gas)		
1,3-Butadiene (gas)		
Carbon disulfide		
Chlorine (gas)		
Dichloromethane		
Diethylamine		
Dimethylformamide		
Dimethyl sulfate		
Ethyl acetate		
Ethylene oxide (gas)		
Hexane		
Hydrogen chloride (gas)		
Methanol		
Methyl chloride (gas)		
Nitrobenzene		
Sodium hydroxide, 50% w/w		
Sulfuric acid, 96.1% w/w		
Tetrachloroethylene		
Tetrahydrofuran		
Blister Agent Requirements	≤1.33	≤4.00
Distilled Mustard		
Nerve Agent Requirements	≤0.40	≤1.25
Soman		
Optional Liquefied Gases [b]	≤6.0	
Ammonia (liquefied)		
Chlorine (liquefied)		
Ethylene oxide (liquefied)		

[a] Repeat the Result column for each material and seam tested.

[b] Liquefied chemical gases are only evaluated over a 15-minute exposure period.

Supplemental Information

File Name	Description	Approved
1990_SR_144_5.2.3.1.2.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 11:15:52 EST 2020

Committee Statement

Committee Statement: Corrections have been made to the Technical Data Package reporting requirements to reflect changes made in Chapters 7 and 8.

Response Message: SR-144-NFPA 1990-2020

Public Comment No. 168-NFPA 1990-2020 [Section No. 5.2.3.1.2]

Public Comment No. 288-NFPA 1990-2020 [Section No. 5.2.3.1.2]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Lakomiak, Paul S.

Toluene was omitted from Chemical list on chart.

Second Revision No. 83-NFPA 1990-2020 [Section No. 5.3.1.1.2]

5.3.1.1.2

For garments where the integrity of the interfaces between the respirator and hood or garment, between the gloves and garment sleeves, and between the footwear and garment legs has not been evaluated as specified in ~~12.4.1 or 12.5.1~~ 7.1.1.1.2 , the following warning shall be provided on the product label:

WARNING — THE INTEGRITY OF THE FOLLOWING INTERFACES OF THIS GARMENT WITH T

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:17:36 EST 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-83-NFPA 1990-2020

Public Comment No. 45-NFPA 1990-2020 [Section No. 5.3.1.1.2]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

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Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Fithian, William A.

Two edits are required: Section 5.3.1.2.2.1 - Where the glove is not "compliant with" (needs to be changed to: certified to); and Section 5.3.1.3.1 - Each liquid splash-protective footwear "piece" (needs to be changed to: element)

Second Revision No. 84-NFPA 1990-2020 [Section No. 5.3.1.4.1.1]

5.3.1.4.1.1

Where the ~~footwear~~ hood provides the optional limited flash fire protection above the basic requirements of this standard, the YES box shall be marked.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:18:43 EST 2020

Committee Statement

Committee Statement: Section 5.3.1.4 is Specific Hood Element Compliance not Footwear.
Response Message: SR-84-NFPA 1990-2020

Public Comment No. 46-NFPA 1990-2020 [Section No. 5.3.1.4.1.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
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Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 85-NFPA 1990-2020 [Section No. 5.3.1.4.1.2]

5.3.1.4.1.2

Where the ~~footwear~~ hood does not provide the optional limited flash fire protection above the basic requirements of this standard, the NO box shall be marked.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:20:39 EST 2020

Committee Statement

Committee Statement: Section 5.3.1.4 is Specific Hood Element Compliance not Footwear.
Response Message: SR-85-NFPA 1990-2020

Public Comment No. 47-NFPA 1990-2020 [Section No. 5.3.1.4.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
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Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 86-NFPA 1990-2020 [Section No. 5.3.1.5.1.5]

5.3.1.5.1.5

Where the manufacturer specifies outer boot footwear element options as permitted in ~~11.4.4.2~~ 7.3.5 , the following additional language shall be provided as part of the product label:

OUTER BOOT FOOTWEAR OPTIONS WORN WITH THIS ENSEMBLE MUST MEASURE AT LEA

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 08:22:36 EST 2020

Committee Statement

Committee Statement: 11.4.4.2 is the wrong section reference. Should be section 7.3.5. The height requirement has also been changed to reflect the chapter six requirement.

Response Message: SR-86-NFPA 1990-2020

Public Comment No. 48-NFPA 1990-2020 [Section No. 5.3.1.5.1.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 87-NFPA 1990-2020 [Section No. 5.3.1.6.1.5]

5.3.1.6.1.5

Where the manufacturer specifies outer boot footwear element options as permitted in ~~11.5.5.2~~ 7.3.5 , the following additional language shall be provided as part of the product label:

OUTER BOOT FOOTWEAR OPTIONS WORN WITH THIS ENSEMBLE MUST MEASURE AT LEA

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:25:32 EST 2020

Committee Statement

Committee Statement: 11.5.5.2 is the wrong Section reference. Should be section 7.3.5. The height requirement has also been changed to reflect the chapter six requirement.

Response Message: SR-87-NFPA 1990-2020

Public Comment No. 49-NFPA 1990-2020 [Section No. 5.3.1.6.1.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas

Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
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Kerbow, Kyle
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Lancaster, Beth C.
Lehtonen, Karen E.
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Nystrom, Ulf
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Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 145-NFPA 1990-2020 [Section No. 5.3.3.2]

Global SR-143

5.3.3.2*

The technical data package shall contain all documentation required by this standard and the values obtained from the initial certification showing compliance with the requirements of Chapter 12 in the current edition of this standard using the reporting formats provided in Table 5.3.3.2(a) and Table 5.3.3.2(b) for each ensemble, ensemble element, material, or component, as applicable.

Table 5.3.3.2(a) Format for Reporting NFPA 1992-Specific Certification Test Data in Technical Data Package

Ensemble or Ensemble Element	**Performance Requirement**	**Test Method**	**Requirement**	**Result**
		Base Requirements		
~~Nonencapsulating ensemble or encapsulating ensemble~~Ensemble	Liquidtight integrity	ASTM F1359/F1359M with modifications (Section ~~8.2~~8.2.3)	No liquid penetration after 20 minutes	
			No liquid accumulation in outer gloves	
			No liquid accumulation in outer boots	
			No liquid inside ensemble next to exhaust valves	
	Overall function and integrity	ASTM F1154 (Section 8.6.1)	No liquid penetration after 20 minutes	
~~Garment (or hood)~~	~~Overall function and integrity~~	~~ASTM F1154 (Section 8.3)~~	Complete all tasks within 15 minutes	
			~~No liquid penetration~~	
			Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)	
			Test subject has visual acuity of 20/35 or better through visor and facepiece lens	
			~~Protective flap remains closed over closure system~~	
			Test subject properly identifies ~~3~~three out of ~~4~~four numbers on NFPA 704 placard at each angle	
			Time to remove hands from and reinsert hands in gloves 5 times ≤2.5 minutes	
			Garment closures remain engaged	
			Protective flap stays remain closed	
	Airflow capacity	Section 8.6.2	Internal garment pressure ≤150 mm (6 in.) water gauge	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
		Base Requirements		
			Ending garment pressure ≥80 mm (3 5/32 in.) water gauge	
Exhaust valve	Mounting strength	Section 8.5.4	Strength >135 N (30 lbf)	
External fitting	Installation effect on integrity	ASTM F1052 (Section 8.2.1)	No liquid penetration in 20 minutes in liquid integrity test	
	Pull-out strength (tethered applications)	Section 8.5.5	Strength >1000 N (225 lbf)	
	Pull-out strength (non-tethered applications)	Section 8.5.5	Strength >1000 N (225 lbf)	
Garment (or hood or sock) material	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Burst strength	ASTM D751 (Section ~~8.8~~8.5.1)	Strength ≥135 N (30 lbf)	
	Puncture propagation tear resistance	ASTM D2582 (Section ~~8.6~~8.5.2)	Tear resistance ≥25 N (5.6 lbf)	
	Cold temperature ~~performance~~bending	ASTM D747 (Section ~~8.7~~8.5.11.1)	Bending moment ≦0.057 N·m (0.5 in.-lb)	
Garment (or hood) visor	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Visor high-mass impact resistance	~~Section 9.11 of ANSI/ISEA Z87.1~~ (Section ~~8.9~~8.5.10~~)~~	No full-thickness cracks, holes, or fractures	
Garment (or hood) seam	Cold temperature bending	Section 8.5.11.2	No cracking or evidence of visual damage	
	Chemical penetration resistance test	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Seam~~-breaking~~ strength	ASTM D751 (Section ~~8.8~~8.5.3)	Strength ≥33 N/25 mm (7.6 in.·lbf)	
Garment (or hood) closure	~~Chemical penetration resistance~~	~~ASTM F903 (Section 8.4)~~	~~No penetration for at least 1 hour for each of the specified chemicals~~	
	Closure~~-breaking~~ strength	ASTM D751 (Section ~~8.8~~9.5.3)	Strength ≥33 N/25 mm (7.5 in.·lbf)	
~~Interface~~Elastomeric interface material	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Elongation	Method A of ASTM D412 (Section 8.5.6)	Elongation at rupture ≥125 percent	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
		Base Requirements		
	Cut resistance	ASTM F1790 (Section ~~8.11~~8.5.7)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	
	Puncture resistance	Method A of ASTM F1342/F1342M (Section ~~8.12~~8.5.8.1)	Puncture force ≥7 N (1.6 lbf)	
	Ultimate tensile strength	ASTM D412 (Section ~~8.22~~8.5.6)	Strength ≥4 MPa (580 psi)	
Gloves	Liquidtight integrity	ASTM D5151 with modifications (Section ~~8.10~~8.2.3.2)	No leakage	
	Dexterity	ASTM F2010/F2010M (Section ~~8.13~~8.6.5)	Percent increase over barehanded control ≤200 percent	
Glove material	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Cut resistance	ASTM F1790 (Section ~~8.11~~8.5.7)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	
	Puncture resistance	Method A of ASTM F1342/F1342M (Section ~~8.12~~8.5.8.1)	Puncture force ≥ ~~11 N~~9 N (2 lbf)	
	Cold temperature ~~performance~~bending	ASTM D747 (Section ~~8.7~~8.5.11.1)	Bending moment ≤0.057 N·m (0.5 in.-lb)	
Glove material seams	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
~~Footwear~~Full footwear	Liquidtight integrity	~~ASTM D5151 with modifications (~~Section ~~8.10)~~8.2.3.3	No leakage	
	Toe impact and compression resistance; sole puncture resistance	ASTM F2412	Footwear meets ~~toe~~ASTM F2413 criteria	
	~~Slip resistance~~	~~ASTM F2913 (Section 8.16)~~	~~Coefficient ≥ 0.40~~	
~~Footwear~~Full footwear upper materials	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
	Cut resistance	ASTM F1790 (Section ~~8.11~~8.5.7)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
	Puncture resistance	Method A of ASTM F1342/F1342M ~~(Section 8.12)~~	Puncture force ≥36 N (8.0 lbf)	
~~Footwear~~Full footwear upper material seams	Chemical penetration resistance	ASTM F903 (Section ~~8.4~~8.3.2)	No penetration for at least 1 hour for each of the specified chemicals	See Table 5.3.3.2(b)
~~Footwear~~Full footwear sole and heels	Abrasion resistance	Method A of ISO 4649 (Section 8.14)	Relative volume loss ≤250 mm^3	
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	
~~Footwear ladder shanks~~	~~Bending resistance~~	~~Section 8.15~~	~~Deflection ≤ 6 mm~~	
Outer boot	Liquidtight integrity	Section 8.2.3.3	No leakage	
	Toe impact and compression resistance; sole puncture resistance	ASTM F2412	Footwear meets ASTM F2413 criteria	
Outer boot upper material	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	
	Puncture resistance	Method A of ASTM F1342/ F1342M	Puncture force ≥36 N (8.0 lbf)	
Outer boot sole and heels	Abrasion resistance	Method A of ISO 4649 (Section 8.14)	Relative volume loss ≤250 mm^3	
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	
Footwear cover	Liquid integrity	ASTM D5151 with modifications (Section 8.2.3.2)	No leakage	
Footwear cover upper material	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 150 g (0.8 in. at 5.29 oz)	
	Puncture resistance	Method A of ASTM F1342/ F1342M	Puncture force ≥15 N (3.8 lbf)	
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bending moment ≤0.057 N·m (0.5 in.-lb)	
Footwear cover wear surface	Abrasion resistance	ASTM D3884 (Section 8.5.9.2)	Wear-through ≥3000 cycles	
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	
Optional Flash Fire Protection Requirements				
Ensemble	Overall flash protection	~~Section 8.17~~ASTM F1930 (Section 8.4.4)	Afterflame times ≤2 seconds	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
			~~No liquid penetration~~ Test subject has visual acuity of 20/35 or better through visor and facepiece lens Break-open of material or seam ≤51 mm (2.0 in.) No evidence of dripping Percent second-degree and third-degree body burn area (optional reporting)	
Garment material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	HTP rating ≥ ~~12~~8 cal/cm^2 (29.5 Btu/ft^2)	
	Flame resistance	ASTM F1358 (Section ~~8.19~~8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting or dripping	
Visor material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	Average HTP rating ≥ ~~12~~8 cal/cm^2 (29.5 Btu/ft^2)	
	Flame resistance	ASTM F1358 (Section ~~8.19~~8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting or dripping	
Glove material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	Average HTP rating ≥ ~~12~~8 cal/cm^2 (29.5 Btu/ft^2)	
	Flame resistance	ASTM F1358 (Section ~~8.19~~8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting or dripping	
Footwear material	Heat transfer performance	ASTM F2700 (Section ~~8.18~~8.4.2)	Average HTP rating ≥ ~~12~~8 cal/cm^2 (29.5 Btu/ft^2)	
	Flame resistance	ASTM F1358 (Section ~~8.19~~8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting or dripping	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Requirement	Result
Base Requirements				
Elastomeric Interface Materials	Flame resistance	ASTM F1358 (Section ~~8.19~~8.4.1)	Afterflame time ≤2 seconds	
			Burn distance ≤100 mm (4.0 in.)	
			No melting or dripping	
~~Interface material~~	~~Heat transfer performance~~	~~ASTM F2700 (Section 8.18)~~	~~Average HTP rating ≥ 12 cal/cm^2~~	
	~~Flame resistance~~	~~ASTM F1358 (Section 8.19)~~	~~Afterflame time ≤2 seconds~~	
			~~Burn distance ≤100 mm~~	
			~~No melting or dripping~~	
Optional Stealth Performance				
Ensemble	Acoustic signature	Section 8.7.2	Report only (dBA)	
Each ensemble material	Color/visibility	Section 8.7.1	Y Brightness <25	
			L* value <55	
Optional Breathability Claim				
Garment (or hood) material	Total heat loss	Method C of ASTM F1868 (Section ~~8.20~~8.6.4.1)	Total heat loss ~~(report only)~~≥200 W/m^2 (if breathability is claimed)	
			Apparent intrinsic evaporative resistance (report only)	
			Intrinsic thermal resistance (report only)	
	Evaporative resistance	Method B of ASTM F1868 (Section ~~8.25~~8.6.4.2)	Evaporative resistance ≤30 Pa·m^2/W (if breathability is claimed)	

Table 5.3.3.2(b) Format for Reporting NFPA 1992-Specific Certification Penetration Test Data in Technical Data Package

Chemical (concentration)	Minimum Requirement*	Garment Material	Garment Visor	Garment Seam	~~Garment Closure~~	Interface Material	Glove Materia
Butyl acetate, CAS No. 123-86-4, >95%	Pass			NR	~~NR~~		
Dimethylformamide, CAS No. 68-12-2, >95%	Pass			NR	~~NR~~		
Fuel H (42.5% toluene, 42.5% isooctane, 15% ethanol mixture, v/v)	Pass						
Isopropyl alcohol, CAS No. 67-63-0, >91%	Pass			NR	~~NR~~		

Chemical (concentration)	Minimum Requirement*	Garment Material	Garment Visor	Garment Seam	~~Garment Closure~~	Interface Material	Glove Materia
Methyl isobutyl ketone, CAS No. 108-10-1, >95%	Pass						
Nitrobenzene, CAS No. 98-95-3, >95%	Pass			NR	~~NR~~		
Sodium hydroxide, CAS No. 1310-73-2, 50%	Pass			NR	~~NR~~		
Sodium hypochlorite, 10%	Pass			NR	~~NR~~		
Sulfuric acid, CAS No. 7664-93-9, 93.1%	Pass						
Tetrachloroethylene, CAS No. 127-18-4, >95%	Pass			NR	~~NR~~		

NR: Indicates no requirement for testing.

*A pass result indicates no liquid penetration through the tested specimens after a 1-hour exposure with 1 minute of the exposure at 7.8 kPa (2.0 psi) hydrostatic pressure.

5.3.3.2.1

The technical data package information shall indicate "Pass" for those requirements where there is no quantitative value reported and "Not applicable" for specific requirements that do not apply to the liquid splash-protective ensemble.

5.3.3.2.2

The manufacturer shall be permitted to make modifications in the tabular format to accommodate specific product features or additional materials as applicable to the certified product.

Supplemental Information

File Name	Description	Approved
1990_SR_145_5.3.3.2.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 11:23:18 EST 2020

Committee Statement

Committee Statement: Corrections have been made to the Technical Data Package reporting requirements to reflect changes made in Chapters 7 and 8.

Response Message: SR-145-NFPA 1990-2020

Public Comment No. 50-NFPA 1990-2020 [Section No. 5.3.3.2 [Excluding any Sub-Sections]]

Public Comment No. 289-NFPA 1990-2020 [Section No. 5.3.3.2 [Excluding any Sub-Sections]]

Ballot Results

✔ This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
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Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
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Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 88-NFPA 1990-2020 [Section No. 5.3.3.4]

5.3.3.4*

Descriptions of sizes shall include the range in height and weight for persons fitting each particular size (for garments), or specific sizes in accordance with Chapter ~~11~~ 6 (for gloves and footwear), and shall provide information to the wearer as to whether these sizes apply to persons wearing SCBA, hard hats, communications devices, firefighting protective clothing, and other similar gear.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:29:29 EST 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-88-NFPA 1990-2020

Public Comment No. 51-NFPA 1990-2020 [Section No. 5.3.3.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 77-NFPA 1990-2020 [New Section after 5.4.1.1.2]

5.4.1.1.3

Class 5 garments shall include the following language as part of the product label:

NOT FOR STRUCTURAL FIREFIGHTING.

5.4.1.1.4

Class 5 garments with detachable liners shall include the following language as part of the product label of the outer shell:

THIS PRODUCT IS NOT COMPLIANT WITH THE NFPA 1994 CLASS 5 REQUIREMENTS UNLES

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Nov 05 18:30:38 EST 2020

Committee Statement

Committee Statement: An additional statement is needed on the product label to indicate that Class 5 garments are not suitable for structural firefighting. A second statement is required on the product label to ensure that the full product is correctly configured for its intended protection.

Response Message: SR-77-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 89-NFPA 1990-2020 [Section No. 5.4.1.1.2]

5.4.1.1.2

Where the manufacturer specifies outer footwear element options as permitted in ~~16.1.3.1~~ 7.4.10 , the following additional language shall be provided as part of the product label:

OUTER BOOT FOOTWEAR OPTIONS WORN WITH THIS ENSEMBLE MUST MEASURE AT LEA

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 08:31:45 EST 2020

Committee Statement

Committee Statement: 16.1.3.1 is the wrong section – Should be Section 7.4.10. The height requirement has also been changed to reflect the chapter six requirement.

Response Message: SR-89-NFPA 1990-2020

Public Comment No. 52-NFPA 1990-2020 [Section No. 5.4.1.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 90-NFPA 1990-2020 [Section No. 5.4.1.2.2]

5.4.1.2.2

Where footwear is designed and configured in accordance with ~~16.4.10~~ 6.1.5.3 , the sock, the outer boot, and the integrity cover shall have at least the following compliance statement on each component, and all letters shall be at least 2.5 mm (3⁄32 in.) high:

THIS [insert component name SOCK, OUTER BOOT, or INTEGRITY COVER], WHEN WORN WIT

DO NOT REMOVE THIS LABEL.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 08:33:40 EST 2020

Committee Statement

Committee Statement: 16.4.10 is the wrong section – Should be Section 6.1.5.3.
Response Message: SR-90-NFPA 1990-2020

Public Comment No. 53-NFPA 1990-2020 [Section No. 5.4.1.2.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

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Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 146-NFPA 1990-2020 [Section No. 5.4.3.2]

5.4.3.2*

The technical data package shall contain all documentation required by this standard and the values obtained from the initial certification showing compliance with the requirements of Chapter 7 in the current edition of this standard using the reporting formats provided in Table 5.4.3.2(a)~~,~~ and Table 5.4.3.2(b)~~, and Table 5.4.3.2(d)~~ for each ensemble, ensemble element, material, or component, as applicable.

Table 5.4.3.2(a) Format for Reporting NFPA 1994-Specific Certification Test Data in Technical Data Package

Ensemble or Ensemble Element	**Performance Requirement**	**Test Method**	**Class 1**	**Class 2/2R**	**Class 3/3R**	**Clas**
Ensemble	Overall inward leakage	Section 8.2.2.2	$PPDF_{sys}$ ≥441	$PPDF_{sys}$ ≥328	$PPDF_{sys}$ ≥35	
			$PPDF_{i}$ (local) ≥871	$PPDF_{i}$ (local) ≥481	$PPDF_{i}$ (local) ≥80	
	Liquidtight integrity	ASTM F1359/F1359M (Section 8.2.3)				
F1359M (Section 8.2.3)	No liquid penetration in 20 minutes	No liquid penetration in 20 minutes	No liquid penetration in 8 minutes	No liquid penetration in 4 minutes		
			No liquid accumulation in outer gloves	No liquid accumulation in outer gloves	No liquid accumulation in outer gloves	No liqu accumu in oute
			No liquid accumulation in outer boots	No liquid accumulation in outer boots	No liquid accumulation in outer boots	No liqu accumu in oute
			No liquid inside ensemble next to exhaust valves	No liquid inside ensemble next to exhaust valves	No liquid inside ensemble next to exhaust valves	No liqu ensem to exha valves
	Particle inward leakage	Section 8.2.4				No visi particu test sul OR no area w particu µg/cm2
	Overall ensemble function and integrity	ASTM F1154/ASTM F1359/F1359M (Section 8.6.1)	No liquid penetration in 20 minutes	No liquid penetration in 20 minutes	No liquid penetration in 8 minutes	No liqu penetra minute
			Test subject completes tasks within 20 minutes	Test subject completes tasks within 20 minutes	Test subject completes tasks within 15 minutes	Test su comple tasks w minute
			Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)	Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)	Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)	Accom head p devices meetin ANSI/IS Z89.1 (Class G

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
			Test subject has visual acuity of 20/35 or better through facepiece lens and visor	Test subject has visual acuity of 20/35 or better through facepiece lens and visor	Test subject has visual acuity of 20/35 or better through facepiece lens and visor	Test su has vis acuity c or bette throug facepie and vis
			Test subject identifies three of four letters on test sign	Test subject identifies three of four letters on test sign	Test subject identifies three of four letters on test sign	Test su identifie of four on test
			Time to remove hands from and reinsert hands in gloves 5 times ≤2.5 minutes	Time to remove hands from and reinsert hands in gloves 5 times ≤2.5 minutes	Time to remove hands from and reinsert hands in gloves 5 times ≤2.5 minutes	Time to hands and rei hands gloves ≤2.5 m
			Garment closures remain engaged	Garment closures remain engaged	Garment closures remain engaged	Garme closure remain engage
			Protective flap stays remain closed	Protective flap stays remain closed	Protective flap stays remain closed	Protect stays r closed
	Airflow capacity	Section 8.6.2	Internal garment pressure ≤150 mm (6 in.) water gauge			
			No liquid penetration in 20 minutes			
Exhaust valve	Inward leakage	Section 8.6.3	Leakage rate ≤30 mL/min (1.83 in.3/min)	Leakage rate ≤30 mL/min (1.83 in.3/min)	Leakage rate ≤30 mL/min (1.83 in.3/min)	Leakag ≤30 mL (1.83 ir
	Mounting strength	Section 8.5.4	Strength >135 N (30 lbf)	Strength >135 N (30 lbf)	Strength >135 N (30 lbf)	Strengt N (30 ll
External fitting	Installation effect on integrity	ASTM F1052 (Section 8.2.1)	Ending garment pressure ≥80 mm (3 5/32 in.) water gauge	No liquid penetration in 20 minutes	No liquid penetration in 8 minutes	No liqu penetra minutes
	Pull-out strength (tethered applications)	Section 8.5.5	Strength >1000 N (225 lbf)	Strength >1000 N (225 lbf)	Strength >1000 N (225 lbf)	Strengt N (225
	Pull-out strength (non-tethered applications)	Section 8.5.5	Strength >1000 N (225 lbf)	Strength >1000 N (225 lbf)	Strength >1000 N (225 lbf)	Strengt N (225

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
Garment material	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No per in 1 ho
	Liquid repellency	ISO 6530 (Section 8.3.5)				
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds No melting and dripping			
	Burst strength	ASTM D751 (Section 8.5.1)	Strength >200 N (45 lbf)	Strength >156 N (35 lbf) 2R: Strength >200 N (45 lbf)	Strength >145 N (25 lbf) 3R: Strength >156 N (35 lbf)	Strengt N (25 l 4R: Str >156 N
	Puncture propagation tear resistance	ASTM D2582 (Section 8.5.2)	Tear resistance ≥49 N (11 lbf)	Tear resistance ≥31 N (7 lbf) 2R: Tear resistance ≥49 N (11 lbf)	Tear resistance ≥25 N (5.6 lbf) 3R: Tear resistance ≥31 N (7 lbf)	Tear re ≥25 N (4R: Tea resista N (7 lbf
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend n ≤0.057 (0.5 in.
	Total heat loss	Method C of ASTM F1868 (Section 8.6.4.1)		Total heat loss ≥200 W/m ^{2} (if breathability is claimed)	Total heat loss ≥200 W/m ^{2}	Total h ≥450 W

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Evaporative resistance	Method B of ASTM F1868 (Section 8.6.4.2)		Evaporative resistance ≤30 Pa·m^2/W (if breathability is claimed)	Evaporative resistance ≤30 Pa·m^2/W	Evapor resista Pa·m^2
Garment seam	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m^2 (1 hour); ≤0.43 µg/m^2 (first 15 minutes)	Cumulative permeation ≤1.25 µg/m^2 (1 hour); ≤0.43 µg/m^2 (first 15 minutes)	Cumulative permeation ≤1.25 µg/m^2 (1 hour); ≤0.43 µg/m^2 (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 µg/m^2 (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No pen in 1 ho
	Seam strength	ASTM D751 (Section 8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strengt N/25 m in.·lbf)
Garment closure	Closure strength	ASTM D751 (Section 8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strengt N/25 m in.·lbf)
Visor material	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	Cumulative permeation ≤6.0 µg/m^2 (1 hour); ≤2.0 µg/m^2 (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	Cumulative permeation ≤4.0 µg/m^2 (1 hour); ≤1.33 µg/m^2 (first 15 minutes)	

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No per in 1 ho
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds No melting and dripping			
	Visor high-mass impact resistance	Section 8.5.10	No full-thickness cracks, holes, or fractures	No full-thickness cracks, holes, or fractures	No full-thickness cracks, holes, or fractures	No full-thickne cracks, or fract
	Cold temperature bending	Section 8.5.11.2	No cracking or evidence of visual damage	No cracking or evidence of visual damage	No cracking or evidence of visual damage	No crac evidenc visual c
Visor seam	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour); ≤2.0 µg/m ^{2} (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 µg/m ^{2} (1 hour); ≤1.33 µg/m ^{2} (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 µg/m ^{2} (1 hour); ≤0.43 µg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 µg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No per in 1 ho

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Seam strength	ASTM D751 (Section 8.5.3)	Strength >67 N/25 mm (15 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strength >34 N/25 mm (7.6 in.·lbf)	Strengt N/25 m in.·lbf)
Elastomeric interface material	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 μg/m 2 (1 hour); ≤2.0 μg/m 2 (first 15 minutes)	Cumulative permeation ≤6.0 μg/m 2 (1 hour); ≤2.0 μg/m 2 (first 15 minutes)	Cumulative permeation ≤6.0 μg/m 2 (1 hour); ≤2.0 μg/m 2 (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m 2 (1 hour); ≤1.33 μg/m 2 (first 15 minutes)	Cumulative permeation ≤4.0 μg/m 2 (1 hour); ≤1.33 μg/m 2 (first 15 minutes)	Cumulative permeation ≤4.0 μg/m 2 (1 hour); ≤1.33 μg/m 2 (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m 2 (1 hour); ≤0.43 μg/m 2 (first 15 minutes)	Cumulative permeation ≤1.25 μg/m 2 (1 hour); ≤0.43 μg/m 2 (first 15 minutes)	Cumulative permeation ≤1.25 μg/m 2 (1 hour); ≤0.43 μg/m 2 (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 μg/m 2 (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No pen in 1 ho
	Elongation	Method A of ASTM D412 (Section 8.5.6)	Elongation at rupture ≥125 percent	Elongation at rupture ≥125 percent	Elongation at rupture ≥125 percent	Elonga rupture percen
	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	Blade t distanc mm at (0.8 in. oz)
	Puncture resistance	Method A of ASTM F1342/F1342M (Section 8.5.8.1)	Puncture force ≥22 N (5 lbf)	Puncture force ≥22 N (5 lbf)	Puncture force ≥22 N (5 lbf)	Punctu ≥22 N (
	Ultimate tensile strength	Method A of ASTM D412 (Section 8.5.6)	Strength ≥4 MPa (580 psi)	Strength ≥4 MPa (580 psi)	Strength ≥4 MPa (580 psi)	Strengt MPa (5
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend n ≤0.057 (0.5 in.
Gloves	Liquidtight integrity	ASTM D5151 with modifications (Section 8.2.3.2)	No leakage	No leakage	No leakage	No leak

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Dexterity	ASTM F2010/F2010M (Section 8.6.5)	Percent increase in bare-handed control ≤300 percent	Percent increase in bare-handed control ≤300 percent	Percent increase in bare-handed control ≤200 percent	Percen increas bare-ha control percen
Glove material	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No pen in 1 ho
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds No melting			
	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 75 g (0.8 in. at 2.64 oz)	Blade travel distance ≥20 mm at 75 g (0.8 in. at 2.64 oz)	Blade travel distance ≥20 mm at 50 g (0.8 in. at 1.76 oz)	Blade t distanc mm at (0.8 in. oz)
	Puncture resistance	Method A of ASTM F1342/F1342M (Section 8.5.8.1)	Puncture force ≥15 N (3.8 lbf)	Puncture force ≥15 N (3.8 lbf)	Puncture force ≥9 N (2 lbf)	Punctu ≥9 N (2
	Cold temperature bending	ASTM D747	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend m ≤0.057 (0.5 in.
Full footwear	Liquidtight integrity	Section 8.2.3.3	No leakage	No leakage	No leakage	No leak

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Impact, compression, and sole puncture resistance	ASTM F2412	Footwear meets ASTM F2413 criteria	Footwear meets ASTM F2413 criteria		
Full footwear upper material	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No pen in 1 ho
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds No melting and dripping			
	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade t distanc mm at (0.8 in. 12.35 c
	Puncture resistance	Method A of ASTM F1342/F1342M (Section 8.5.8.1)	Puncture force ≥36 N (8.0 lbf)	Puncture force ≥36 N (8.0 lbf)	Puncture force ≥36 N (8.0 lbf)	Punctu ≥36 N (
Full footwear soles and heels	Abrasion resistance	Method A of ISO 4649 (Section 8.5.9.2)	Relative volume loss ≤250 mm ^{3}	Relative volume loss ≤250 mm ^{3}	Relative volume loss ≤250 mm ^{3}	Relativ volume ≤250 m
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	Coefficient ≥0.40	Coefficient ≥0.40	Coeffic ≥0.40

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
Sock	Toxic industrial chemical permeation resistance	Section 8.3.1.2	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour); ≤2.0 μg/m ^{2} (first 15 minutes)	
	Sulfur mustard (HD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤4.0 μg/m ^{2} (1 hour); ≤1.33 μg/m ^{2} (first 15 minutes)	
	Soman (GD) permeation resistance	Section 8.3.1.2	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	Cumulative permeation ≤1.25 μg/m ^{2} (1 hour); ≤0.43 μg/m ^{2} (first 15 minutes)	
	Low vapor pressure chemical permeation resistance	Section 8.3.1.3	Cumulative permeation ≤6.0 μg/m ^{2} (1 hour)			
	Viral penetration resistance	ASTM F1671 (Section 8.3.4)		No penetration in 1 hour	No penetration in 1 hour	No per in 1 ho
	Burst strength	ASTM D751 (Section 8.5.1)	Strength >156 N (35 lbf)	Strength >156 N (35 lbf)	Strength >145 N (25 lbf)	Streng N (25 l
	Puncture propagation tear resistance	ASTM D2582 (Section 8.5.2)	Tear resistance ≥31 N (7 lbf)	Tear resistance ≥31 N (7 lbf)	Tear resistance ≥25 N (5.6 lbf)	Tear re ≥25 N (
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend moment ≤0.057 N·m (0.5 in.-lb)	Bend n ≤0.057 (0.5 in.
Outer boot	Liquidtight integrity	Section 8.2.3.3	No leakage	No leakage	No leakage	No leal
	Toe impact and compression resistance; sole puncture resistance	ASTM F2412	Footwear meets ASTM F2413 criteria	Footwear meets ASTM F2413 criteria		
Outer boot upper material	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade travel distance ≥20 mm at 350 g (0.8 in. at 12.35 oz)	Blade t distanc mm at (0.8 in. 12.35 c
	Puncture resistance	Method A of ASTM F1342/F1342M	Puncture force ≥36 N (8.0 lbf)	Puncture force ≥36 N (8.0 lbf)	Puncture force ≥36 N (8.0 lbf)	Punctu ≥36 N (

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
Outer boot sole and heels	Abrasion resistance	Method A of ISO 4649 (Section 8.14)	Relative volume loss ≤250 mm^3	Relative volume loss ≤250 mm^3	Relative volume loss ≤250 mm^3	Relativ volume ≤250 m
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	Coefficient ≥0.40	Coefficient ≥0.40	Coeffic ≥0.40
Footwear cover	Liquid integrity	ASTM D5151 with modifications (Section 8.2.3.2)	No leakage	No leakage	No leakage	No leal
Footwear cover upper material	Cut resistance	ASTM F1790 (Section 8.5.7)	Blade travel distance ≥20 mm at 150 g (0.8 in. at 5.29 oz)	Blade travel distance ≥20 mm at 150 g (0.8 in. at 5.29 oz)	Blade travel distance ≥20 mm at 150 g (0.8 in. at 5.29 oz)	Blade t distanc mm at (0.8 in. oz)
	Puncture resistance	Method A of ASTM F1342/F1342M	Puncture force ≥15 N (3.8 lbf)	Puncture force ≥15 N (3.8 lbf)	Puncture force ≥15 N (3.8 lbf)	Punctu ≥15 N (
	Cold temperature bending	ASTM D747 (Section 8.5.11.1)	Bending moment ≤0.057 N·m (0.5 in.-lb)	Bending moment ≤0.057 N·m (0.5 in.-lb)	Bending moment ≤0.057 N·m (0.5 in.-lb)	Bendin momer ≤0.057 (0.5 in.
Footwear cover wear surface	Abrasion resistance	ASTM D3884 (Section 8.5.9.2)	Wear-through ≥3000 cycles	Wear-through ≥3000 cycles	Wear-through ≥3000 cycles	Wear-tl ≥3000
	Slip resistance	ASTM F2913 (Section 8.6.7)	Coefficient ≥0.40	Coefficient ≥0.40	Coefficient ≥0.40	Coeffic ≥0.40
Ensemble	Overall flash fire protection	ASTM F1930 (Section 8.4.4)	Afterflame time ≤5 seconds	Afterflame time ≤5 seconds	Afterflame time ≤5 seconds	Afterfla ≤5 seco
			Test subject has visual acuity of 20/100 or better through facepiece lens and visor	Test subject has visual acuity of 20/100 or better through facepiece lens and visor	Test subject has visual acuity of 20/100 or better through facepiece lens and visor	Test su has vis acuity c 20/100 better t facepie and vis
			Break-open of material or seam ≤51 mm (2.0 in.)	Break-open of material or seam ≤51 mm (2.0 in.)	Break-open of material or seam ≤51 mm (2.0 in.)	Break-c materia seam ≤ (2.0 in.
			No evidence of dripping	No evidence of dripping	No evidence of dripping	No evic drippin

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
			Percent second-degree and third-degree body burn area (optional reporting)	Percent second-degree and third-degree body burn area (optional reporting)	Percent second-degree and third-degree body burn area (optional reporting)	Percen second and thi degree burn ar (option reportir
Garment material	Heat transfer performance	ASTM F2700 (Section 8.4.2)	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP ra cal/cm Btu/ft ^{2}
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterfla ≤2 sec Burn di ≤100 m in.) No mel drippin
Visor material	Heat transfer performance	ASTM F2700 (Section 8.4.2)	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP ra cal/cm Btu/ft ^{2}
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterfla ≤2 sec Burn di ≤100 m in.) No mel drippin
Glove material	Heat transfer performance	ASTM F2700 (Section 8.4.2)	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP ra cal/cm Btu/ft ^{2}
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterflame time ≤2 seconds Burn distance ≤100 mm (4.0 in.) No melting and dripping	Afterfla ≤2 sec Burn di ≤100 m in.) No mel drippin
Footwear material	Heat transfer performance	ASTM F2700 (Section 8.4.2)	HTP rating ≥12 cal/cm ^{2}	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP rating ≥8 cal/cm ^{2} (29.5 Btu/ft ^{2})	HTP ra cal/cm Btu/ft ^{2}

Ensemble or Ensemble Element	Performance Requirement	Test Method	Class 1	Class 2/2R	Class 3/3R	Clas
	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds	Afterflame time ≤2 seconds	Afterflame time ≤2 seconds	Afterfla ≤2 sec
			Burn distance ≤100 mm (4.0 in.)	Burn distance ≤100 mm (4.0 in.)	Burn distance ≤100 mm (4.0 in.)	Burn di ≤100 m in.)
			No melting and dripping	No melting and dripping	No melting and dripping	No mel drippin
Elastomeric interface material	Flame resistance	ASTM F1358 (Section 8.4.1)	Afterflame time ≤2 seconds	Afterflame time ≤2 seconds	Afterflame time ≤2 seconds	Afterfla ≤2 sec
			Burn distance ≤100 mm (4.0 in.)	Burn distance ≤100 mm (4.0 in.)	Burn distance ≤100 mm (4.0 in.)	Burn di ≤100 m in.)
			No melting and dripping	No melting and dripping	No melting and dripping	No mel drippin
Ensemble	Acoustic signature	Section 8.7.2	Report only (dBA)	Report only (dBA)	Report only (dBA)	Report (dBA)
Each ensemble material	Color/visibility	Section 8.7.1	Y Brightness <25	Y Brightness <25	Y Brightness <25	Y Brigh <25
			L* value <55	L* value <55	L* value <55	L* valu

~~Table 5.4.3.2(a) Format for Reporting NFPA 1994–Specific Certification Test Data in Technical Data Package~~

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
~~Nonencapsulating ensemble or encapsulating ensemble~~	~~Liquidtight integrity~~	~~Procedure A of ASTM F1359/F1359M (Section 8.4)~~	~~No liquid penetration~~	
	~~Overall inward leakage (MIST)~~	~~Section 8.2~~	~~$PPDF_i$ ≥ 871~~ ~~$PPDF_{sys}$ ≥ 441~~	
	~~Overall ensemble function and integrity~~	~~Procedures A and B of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 20 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
			~~Test subject properly identifies 3 out of 4 numbers on NFPA 704 placard at each angle~~	
	~~Gastight integrity~~	~~ASTM F1052 (Section 8.26)~~	~~Ending suit pressure ≥ 80 mm ($3\frac{5}{32}$ in.) water gauge~~	
~~Encapsulating ensemble~~	~~Overall function and integrity~~	~~ASTM F1154 (Section 8.3)~~	~~Time to remove hands from and reinsert hands in gloves 5 times ≤ 2.5 minutes~~	
	~~Maximum ventilation rate~~	~~Section 8.27~~	~~Internal suit pressure ≤ 150 mm (6 in.) water gauge~~	
~~External fitting~~	~~Gastight integrity~~	~~ASTM F1052 (Section 8.26)~~	~~Ending suit pressure ≥ 80 mm ($3\frac{5}{32}$ in.) water gauge~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings not intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.^{3} /min)~~	
~~Class 1 Garment Elements~~				
~~Materials and seams~~	~~Chemical penetration resistance~~	~~Section 8.33~~		*~~[See Table 15.3.2(c).]~~*
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Garment materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 200 N (45 lbf)~~	
~~Sock materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 156 N (35 lbf)~~	
~~Garment materials~~	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 49 N (11 lbf)~~	
~~Sock materials~~	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 31 N (7 lbf)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Garment materials~~	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~Garment materials~~	~~Flammability resistance~~	~~ASTM F1358 (Section 8.28)~~	~~Afterflame time of ≤ 2.0 seconds and does not melt and drip~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 67 N/25 mm (15 lbf/1 in.)~~	
~~Class 1 Garment Visors~~				
~~Materials and seams~~	~~Chemical penetration resistance~~	~~Section 8.33~~		*~~[See Table 15.3.2(c).]~~*
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Materials~~	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Materials~~	~~Flammability resistance~~	~~ASTM F1358 (Section 8.28)~~	~~Afterflame time of ≤ 2.0 seconds and does not melt and drip~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 67 N/25 mm (15 lbf/1 in.)~~	
~~Elastomeric Interface Materials~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical penetration resistance~~	~~Section 8.33~~		*~~[See Table 15.3.2(c).]~~*
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~Class 1 Glove Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
	~~Chemical penetration resistance~~	~~Section 8.33~~		~~*[See Table 15.3.2(c).]*~~
	~~Chemical permeation resistance~~	~~Section 8.7~~		~~*[See Table 15.3.2(b).]*~~
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 15 N (3.8 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Flammability resistance~~	~~ASTM F1358 (Section 8.28)~~	~~Afterflame time of ≤ 2.0 seconds and does not melt and drip~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 300%~~	
~~*Class 1 Footwear Elements*~~				
	~~Chemical penetration resistance~~	~~Section 8.33~~		~~*[See Table 15.3.2(c).]*~~
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
	~~Flammability resistance~~	~~ASTM F1358 (Section 8.28)~~	~~Afterflame time of ≤ 2.0 seconds and does not melt and drip~~	
~~Upper materials~~	~~Chemical permeation resistance~~	~~Section 8.7~~		~~*[See Table 15.3.2(b).]*~~
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm~~ ^{3} ~~(0.015 in.~~ ^{3} ~~)~~	
			~~Meet the requirements specified in 17.1.4.1, 17.1.4.2, 17.1.4.3, 17.1.4.4, 17.1.4.6, and 17.1.4.7~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		~~-~~	~~-~~	~~-~~
~~Footwear covers~~	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement in 17.1.4.3~~	
~~Class 2 Ensembles~~				
	~~Liquidtight integrity~~	~~Procedure A of ASTM F1359/F1359M (Section 8.4)~~	~~No liquid penetration~~	
	~~Overall inward leakage (MIST)~~	~~Section 8.2~~	~~*PPDF* $_i$ ≥ 481~~	
			~~*PPDF* $_{sys}$ ≥ 328~~	
	~~Overall function and integrity~~	~~Procedures A and B in ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 20 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings not intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.~~ ^{3} ~~/min)~~	
~~Class 2 Garment Elements~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Garment materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 156 N (35 lbf)~~	
~~Garment materials~~	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 31 N (7 lbf)~~	
~~Garment materials~~	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.-lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 2 Garment Visors~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 2 Elastomeric Interface Materials~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~Class 2 Glove Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 15 N (3.8 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 300%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21 or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~Class 2 Footwear Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Upper materials~~	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss will not be > 250 mm ^{3} (0.015 in. ^{3})~~	
~~Footwear covers~~			~~Meet the requirements specified in 17.2.4.1, 17.2.4.2, 17.2.4.3, 17.2.4.4, 17.2.4.6, and 17.2.4.7~~	
	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement in 17.2.4.3~~	
~~*Class 2R Ensembles*~~				
	~~Liquidtight integrity~~	~~Procedure A of ASTM F1359/F1359M (Section 8.4)~~	~~No liquid penetration~~	
	~~Overall inward leakage (MIST)~~	~~Section 8.2~~	~~$PPDF_i$ ≥ 481~~ ~~$PPDF_{sys}$ ≥ 328~~	
	~~Overall function and integrity~~	~~Procedures A and B of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 20 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings not intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.^{3} /min)~~	
~~*Class 2R Garment Elements*~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		~~*[See Table 15.3.2(b).]*~~
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Garment materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 200 N (45 lbf)~~	
~~Sock materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 156 N (35 lbf)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Garment materials~~	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 49 N (11 lbf)~~	
~~Sock materials~~	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 31 N (7 lbf)~~	
~~Garment materials~~	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 67 N/25 mm (15 lbf/1 in.)~~	
~~Class 2R Garment Visors~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 67 N/25 mm (15 lbf/1 in.)~~	
~~Class 2R Elastomeric Interface Materials~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~Class 2R Glove Elements~~				

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 15 N (3.8 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 300%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21 or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~Class 2R Footwear Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
		~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
	~~Slip resistance~~	~~ASTM F2412~~	~~Meets ASTM F2413 for impact-, compression-, and puncture-resistant footwear with the exception of flex resistance to cracking~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Upper materials~~	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~***Class 1 Ensembles***~~		-	-	-
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm ^{3} (0.015 in. ^{3})~~	
~~Footwear covers~~			~~Meet the requirements specified in 17.3.4.1, 17.3.4.2, 17.3.4.3, 17.3.4.4, 17.3.4.6, and 17.3.4.7, excluding 17.3.4.5~~	
	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement in 17.3.4.3~~	
~~***Class 3R Ensembles***~~				
	~~Liquidtight integrity~~	~~Procedure A of ASTM F1359/F1359M (Section 8.4)~~	~~No liquid penetration~~	
	~~Overall inward leakage (MIST)~~	~~Section 8.2~~	~~$PPDF_i$ ≥ 160~~ ~~$PPDF_{sys}$ ≥ 69~~	
	~~Overall function and integrity~~	~~Procedures A and B of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 20 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings not intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.^{3} /min)~~	
~~Class 3 Garment Elements~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Garment materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 25 N (5 3/5 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60° at −25°C (−13°F)~~	
	~~Total heat loss~~	~~Section 8.8~~	~~≥200 W/m^2~~	
	~~Evaporative resistance~~	~~ISO 11092 (Section 8.20)~~	~~≤30 Pa m^2 /W~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 3 Garment Visors~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1~~		
		~~Section 8.13~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 3 Elastomeric Interface Materials~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~Class 3 Glove Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 9 N (2 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (½ in.-lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 200%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21 or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~Class 3 Footwear Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
~~Upper materials~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~***Class 1 Ensembles***~~		-	-	-
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm ^{3} (0.015 in. ^{3})~~	
~~Footwear covers~~			~~Meet the requirements specified in 17.4.4.1, 17.4.4.2, 17.4.4.3, 17.4.4.4, 17.4.4.6, and 17.4.4.7~~	
	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	
~~Footwear designed and configured according to 6.4.10~~			~~(1) Booties sock meets the requirements specified in 17.4.4.2 and 17.4.4.3~~	
			~~(2) Outer boot meets the requirements specified in 17.4.4.4 and 17.4.4.5~~	
			~~(3) Integrity cover meets the requirements in 17.4.4.1, 17.4.4.7, and 17.4.4.9~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement specified in 17.4.4.3~~	
~~***Class 3 Hood Elements***~~				
			~~Meet all of the applicable requirements specified in 17.4.1~~	
~~Elastomeric interface material~~	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		~~*[See Table 15.3.2(b).]*~~
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~***Class 3R Ensembles***~~				

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
	~~Liquidtight integrity~~	~~Procedure A of ASTM F1359/F1359M (Section 8.4)~~	~~No liquid penetration~~	
	~~Overall inward leakage (MIST)~~	~~Section 8.2~~	~~$PPDF_i$ ≥ 160~~	
			~~$PPDF_{sys}$ ≥ 69~~	
	~~Overall function and integrity~~	~~Procedures A and B of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 20 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings not intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.^{3} /min)~~	
~~*Class 3R Garment Elements*~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		~~*[See Table 15.3.2(b).]*~~
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Garment materials~~	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 156 N (35 lbf)~~	
	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 31 N (7 lbf)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Total heat loss~~	~~Section 8.8~~	~~≥200 W/m ^{2}~~	
	~~Evaporative resistance~~	~~ISO 11092 (Section 8.20)~~	~~≤30 Pa m ^{2} /W~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 3R Garment Visors~~				
~~Materials and seams~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 3R Elastomeric Interface Materials~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (¹⁄₂ in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~Class 3R Glove Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 15 N (3.8 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60° at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 200%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21 or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~Class 3R Footwear Elements~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
~~Upper materials~~	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm~~ ^{3}	
~~Footwear covers~~	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Meet the requirements specified in 17.5.4.1, 17.5.4.2, 17.5.4.3, 17.5.4.4, 17.5.4.5, and 17.5.4.7~~	
			~~Show no wear-through after 3000 cycles~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Footwear designed and configured according to 6.4.10~~			~~(1) Booties sock meets the requirements specified in 17.5.4.2 and 17.5.4.3~~	
			~~(2) Outer boot meets the requirements specified in 17.5.4.4 and 17.5.4.5~~	
			~~(3) Integrity cover meets the requirements in 17.5.4.1, 17.5.4.7, and 17.5.4.9~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement specified in 17.5.4.4~~	
~~Class 3R Hood Elements~~				
			~~Meet all of the applicable requirements specified in 17.5.1~~	
~~Elastomeric interface material~~	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Chemical permeation resistance~~	~~Section 8.7~~		*~~[See Table 15.3.2(b).]~~*
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~Class 4 Ensembles~~				
	~~Overall particulate inward leakage~~	~~Section 8.5~~	~~No visual particulate inward leakage~~	
	~~Overall function and integrity~~	~~Procedures A and of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 15 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~***Class 1 Ensembles***~~		-	-	-
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings (not intended for tethered applications)~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.~~ ^{3} ~~/min)~~	
~~***Class 4 Garment Elements***~~				
~~Garment materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 25 N (5 ⅗ lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Total heat loss~~	~~Section 8.8~~	~~≥450 W/m~~ ^{2}	
	~~Evaporative resistance~~	~~ISO 11092 (Section 8.20)~~	~~≤30 Pa m~~ ^{2} ~~/W~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~***Class 4 Garment Visors***~~				
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~High-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
~~*Class 4 Elastomeric Interface Materials*~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~*Class 4 Glove Elements*~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 9 N (2 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.-lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 200%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21 or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~*Class 4 Footwear Elements*~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
~~Upper materials~~	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~*Class 1 Ensembles*~~		-	-	-
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm ^{3} (0.015 in. ^{3})~~	
~~Footwear covers~~			~~Meet the requirements specified in 17.6.4.1, 17.6.4.2, 17.6.4.3, 17.6.4.4, 17.6.4.6, and 17.6.4.7~~	
	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	
~~Footwear designed and configured according to 6.4.10~~			~~(1) Socks meet the requirements specified in 17.6.4.2~~	
			~~(2) Outer boot meets the requirements specified in 17.6.4.3 and 17.6.4.4~~	
			~~(3) Integrity cover meets the requirements in 17.6.4.1, 17.6.4.7, and 17.6.4.8~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement in 17.6.4.3~~	
~~*Class 4 Hood Elements*~~				
			~~Meet all the applicable requirements specified in 17.6.1~~	
~~Elastomeric interface material~~	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~≥4 MPa (≥580 psi)~~	
~~*Class 4R Ensembles*~~				
	~~Overall particulate inward leakage~~	~~Section 8.5~~	~~No visual particulate inward leakage~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Overall function and integrity~~	~~Procedures A and B of ASTM F1154 (Section 8.3)~~	~~Test subject completes task ≤ 15 minutes~~	
			~~Accommodates head protection devices meeting ANSI/ISEA Z89.1 (Type 1, Class G)~~	
			~~Protective flap remains closed over closure system~~	
			~~Test subject has visual acuity through facepiece lens and visor 20/35 or better~~	
~~External fittings intended for tethered applications~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 1000 N (225 lbf)~~	
~~External fittings (not intended for tethered applications)~~	~~Pull-out strength~~	~~Section 8.6~~	~~Strength ≥ 135 N (≥30 lbf)~~	
~~Exhaust valves~~	~~Mounting strength~~	~~Section 8.24~~	~~Strength ≥ 135 N (30 lbf)~~	
	~~Inward leakage~~	~~Section 8.25~~	~~Leakage rate ≤ 30 mL/min (1.83 in.~~ ^{3} ~~/min)~~	
~~Class 4R Garment Elements~~				
~~Garment materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~Burst strength~~	~~Section 8.9~~	~~Strength ≥ 156 N (35 lbf)~~	
	~~Puncture propagation tear resistance~~	~~ASTM D2582 (Section 8.10)~~	~~Tear resistance ≥ 31 N (7 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
	~~Total heat loss~~	~~Section 8.8~~	~~≥450 W/m~~ ^{2}	
	~~Evaporative resistance~~	~~ISO 11092 (Section 8.20)~~	~~≤30 Pa m~~ ^{2} ~~/W~~	
~~Seams and closure assemblies~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~Class 4R Garment Visors~~				

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~***Class 1 Ensembles***~~		-	-	-
~~Materials~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
	~~Visor high-mass impact resistance~~	~~Section 9.11 of ANSI/ISEA Z87.1 (Section 8.13)~~	~~No full-thickness punctures, cracks, holes, or fractures~~	
~~Material seams~~	~~Seam/closure breaking strength~~	~~ASTM D751 (Section 8.12)~~	~~Breaking strength ≥ 34 N/25 mm (7.5 lbf/1 in.)~~	
~~***Class 4R Elastomeric Interface Materials***~~				
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.-lbf) at an angular deflection of 60 degrees at −25°C (−13°F)~~	
~~***Class 4R Glove Elements***~~				
	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 15 N (3.8 lbf)~~	
	~~Cold temperature performance~~	~~ASTM D747 (Section 8.11)~~	~~Bending moment of ≤ 0.057 N·m (0.5 in.-lbf) at an angular deflection of 60° at −25°C (−13°F)~~	
	~~Glove hand function~~	~~ASTM F2010/F2010M (Section 8.16)~~	~~Average % increase over barehanded control < 200%~~	
~~Materials and seams~~	~~Viral penetration resistance~~	~~ASTM F1671/F1671M [Section 8.21) or Section 8.34 (whole glove test)]~~	~~No penetration for ≥ 1 hour~~	
~~***Class 4R Footwear Elements***~~				

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Upper materials~~	~~Liquidtight integrity~~	~~ASTM D5151 with modifications (Section 8.22)~~	~~No liquid penetration~~	
	~~Slip resistance~~	~~ISO 13287 (Section 8.19)~~	~~Coefficient of friction ≥ 0.40~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 36 N (8 lbf)~~	
	~~Viral penetration resistance~~	~~ASTM F1671/F1671M (Section 8.21)~~	~~No penetration for ≥ 1 hour~~	
~~Soles and heels~~	~~Abrasion resistance~~	~~ISO 4649 (Section 8.17)~~	~~Relative volume loss not > 250 mm~~ ^{3} ~~(0.015 in.~~ ^{3} ~~)~~	
~~Footwear covers~~			~~Meet the requirements specified in 17.7.4.1, 17.7.4.2, 17.7.4.3, 17.7.4.4, 17.7.4.6, and 17.7.4.8~~	
	~~Abrasion resistance~~	~~ASTM D3884 (Section 8.23)~~	~~Show no wear-through after 3000 cycles~~	
~~Footwear designed and configured according to 6.4.10~~			~~(1) Socks meet the requirements specified in 17.7.4.2~~	
			~~(2) Outer boot meets the requirements specified in 17.7.4.3 and 17.7.4.4~~	
			~~(3) Integrity cover meets the requirements in 17.7.4.1, 17.7.4.7, and 17.7.4.8~~	
~~Socks~~			~~Outer boot of the footwear element meets the minimum height requirement specified in 16.4.3 and the cut resistance performance requirement in 17.7.4.3~~	
~~Class 4R Hood Elements~~				
~~Elastomeric interface material~~			~~Meet all the applicable requirements specified in 17.7.1~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Elongation at rupture ≥ 125%~~	
	~~Cut resistance~~	~~ASTM F1790 (Section 8.14)~~	~~Blade travel distance of ≥ 20 mm (0.8 in.)~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
	~~Puncture resistance~~	~~ASTM F1342/F1342M (Section 8.15)~~	~~Puncture resistance of ≥ 7 N (1.6 lbf)~~	
	~~Ultimate tensile strength~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Ultimate tensile strength of ≥ 4 MPa (580 psi)~~	
~~Optional Chemical Flash Fire Protection~~				
~~Ensembles or elements~~	~~Overall flash~~	~~Section 8.30~~	~~Afterflame times ≤ 2 seconds~~	
			~~No liquid penetration~~	
~~Hood with visor~~			~~Visual acuity of 20/100~~	
~~Garment materials, visor, glove, footwear, and elastomeric interface materials~~	~~Heat transfer performance~~	~~ASTM F2700 (Section 8.32)~~	~~≥12 cal/cm ^{2} (>4 in.)~~	
~~Garment materials, visor, glove, footwear, and elastomeric interface materials~~				~~Will not burn at a distance > 100 mm (4 in.), will not sustain burning for > 2 seconds, and will not melt and drip~~
~~Class 1 ensembles and elements~~	~~Flammability resistance~~	~~Method A of ASTM D412 (Section 8.29)~~	~~Meet applicable requirements in Section 17.1~~	
~~Class 2 ensembles and elements~~			~~Meet the applicable requirements in Section 17.2~~	
~~Class 2R ensembles and elements~~			~~Meet the applicable requirements in Section 17.3~~	
~~Class 3 ensembles and elements~~			~~Meet the applicable requirements in Section 17.4~~	
~~Class 3R ensembles and elements~~			~~Meet the applicable requirements in Section 17.5~~	
~~Class 4 ensembles and elements~~			~~Meet the applicable requirements in Section 17.6~~	
~~Class 4R ensembles and elements~~			~~Meet the applicable requirements in Section 17.7~~	
~~Optional Stealth Requirements~~				
~~Ensembles~~	~~Audible signature~~	~~Section 8.34~~	~~Report~~	
~~Garment, glove, footwear, and hood outer materials~~			~~Y brightness value < 25, with an L* value < 55~~	

~~Ensemble or Ensemble Element~~	~~Performance Requirement~~	~~Test Method~~	~~Requirement~~	~~Result~~
~~Class 1 Ensembles~~		-	-	-
~~Class 1 ensembles and elements~~	~~Color/visibility~~	~~Section 8.33~~	~~Meet the applicable requirements in Section 17.1~~	
~~Class 2 ensembles and elements~~			~~Meet the applicable requirements in Section 17.2~~	
~~Class 2R ensembles and elements~~			~~Meet the applicable requirements in Section 17.3~~	
~~Class 3 ensembles and elements~~			~~Meet the applicable requirements in Section 17.4~~	
~~Class 3R ensembles and elements~~			~~Meet the applicable requirements in Section 17.5~~	
~~Class 4 ensembles and elements~~			~~Meet the applicable requirements in Section 17.6~~	
~~Class 4R ensembles and elements~~			~~Meet the applicable requirements in Section 17.7~~	

Table 5.4.3.2(b) Format for Reporting NFPA 1994-Specific Certification Permeation Test Data in Technical Data Package

Chemical	Test Concentration[a]	Time Interval (min)	Minimum Requirement[b]	Garment Material	Garment Seam	Visor Material	Vis Sea
Acrolein (vapor)		15	≤2.0				
		60	≤6.0				
Acrylonitrile (vapor)		15	≤2.0				
		60	≤6.0				
Anhydrous ammonia (gas)		15	≤2.0				
		60	≤6.0				
Chlorine (gas)		15	≤2.0				
		60	≤6.0				
Diethylamine (vapor)[c]		15	≤2.0				
		60	≤6.0				
Dimethyl sulfate (liquid)		15	≤2.0				
		60	≤6.0				
Ethyl acetate (vapor)c		15	≤2.0				
		60	≤6.0				
Sulfuric acid, 96.1% w/wc		~~15~~ 60	~~≤2.0~~ ≤6.0				
		~~60~~	~~≤6.0~~				

Chemical	Test Concentration[a]	Time Interval (min)	Minimum Requirement[b]	Garment Material	Garment Seam	Visor Material	Vis Sea
Tetrachloroethylene (liquid)[c]		15	≤2.0				
		60	≤6.0				
Toluene (liquid)[c]		15	≤2.0				
		60	≤6.0				
Distilled mustard (liquid)		15	≤1.33				
		60	≤4.0				
Soman (liquid)		15	≤0.43				
		60	≤1.25				

[a]Indicate either liquid challenge level [Class 1 — 20 g/m^2 or Class 2/3 — 10 g/m^2] or gas concentration (Class 1 — 1 percent, Class 2 — 350 ppm, Class 3 — 40 ppm).

[b]All values are cumulative permeation mass reported values in $\mu g/cm^2$.

[c]Chemicals for Class 1 only.

~~Table 5.4.3.2(d) Format for Reporting NFPA 1994–Specific Certification Penetration Test Data in Technical Data Package~~

~~Chemical (concentration)~~	~~Minimum Requirement*~~	~~Garment Material~~	~~Garment Seams~~	~~Visor Material~~	~~Visor Seams~~	~~Interface Material~~	~~Glove Material~~	~~F... M~~
~~Sulfuric acid, CAS 7664-93-9, 93.1%~~	~~Pass~~							

~~*A pass result indicates no liquid penetration through the tested specimens after a 1-hour exposure with 1 minute of the exposure at 7.8 kPa hydrostatic pressure.~~

A.5.4.3.2

A standard format for reporting certification data allows end user organizations to readily compare products based on required certification data. Certification organizations reviewing compliance of manufacturer technical data packages ~~to the requirements in 15.3.2~~ can allow modifications to the tables to address liquid splash-protective ensembles with multiple options. For example, columns can be added to or deleted from ~~Table 15.3.2(b)~~ Table 5.3.3.2(a) to address specific materials included as part of the product. Where multiple materials are used in the construction of the ensemble, additional columns with the corresponding results are added.

5.4.3.2.1

The technical data package information shall indicate “Pass” for those requirements where there is no quantitative value reported and “NR (No Requirement)” for specific requirements that do not apply to the protective ensemble.

5.4.3.2.2

The manufacturer shall be permitted to make modifications in the tabular format in order to accommodate specific product features or additional materials as applicable to the certified product.

Supplemental Information

File Name	Description	Approved
1990_SR_146_5.4.3.2.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 11:39:37 EST 2020

Committee Statement

Committee Statement: Corrections have been made to the Technical Data Package reporting requirements to reflect changes made in Chapters 7 and 8.

With the addition of an intermediate level for THL, the Moderate level now represents ≥325 W/m2 and the Low level represents ≥200 W/m2. Therefore, class 3 products will be Low, class 4 products will be High, and class 5 products will be Moderate.

Response Message: SR-146-NFPA 1990-2020

Public Comment No. 272-NFPA 1990-2020 [Section No. 5.4.3.2 [Excluding any Sub-Sections]]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 163-NFPA 1990-2020 [Section No. 5.4.3.3.1]

5.4.3.3.1

Descriptions of size shall include the range in height and weight for persons fitting each particular size (for ensembles) or sizes in accordance with Chapter ~~16~~ 6 (for glove, hood, and footwear elements).

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Wed Nov 11 08:08:47 EST 2020

Committee Statement

Committee Statement: Fixing referenced chapter. It should be chapter 6, not 16.
Response Message: SR-163-NFPA 1990-2020

Public Comment No. 54-NFPA 1990-2020 [Section No. 5.4.3.3.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 27-NFPA 1990-2020 [Chapter 6 [Title Only]]

Design Requirements ~~(NFPA 1991, NFPA 1992, and NFPA 1994)~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:05:33 EDT 2020

Committee Statement

Committee Statement: No longer necessary since NFPA 1999 is being removed.
Response Message: SR-27-NFPA 1990-2020

Public Comment No. 7-NFPA 1990-2020 [Chapter 6 [Title Only]]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 3-NFPA 1990-2020 [Section No. 6.1.1.2 [Excluding any Sub-Sections]]

Encapsulating ensembles shall include the following:

(1) A garment with an integral hood and visor

(2) Attached gloves or glove system consisting of an attached inner glove and a separate outer glove

(3) Attached footwear or footwear consisting of an attached sock and separate outer boot

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 13 11:43:04 EDT 2020

Committee Statement

Committee Statement:	Clarify both glove and glove systems can be used to meet the requirements of the standard.
Response Message:	SR-3-NFPA 1990-2020

Public Comment No. 15-NFPA 1990-2020 [Section No. 6.1.1.2 [Excluding any Sub-Sections]]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Fithian, William A.

There is an error in Section 6.1.4.3: Glove elements shall provide protection to at least 16.5 cm (6.5 in.) from the tip of the longest finger. This distance is too short and does not provide protection far enough beyond the palm.

Second Revision No. 37-NFPA 1990-2020 [Section No. 6.1.2.2.3.1]

6.1.2.2.3.1

Where footwear consists of an attached sock and separate outer boot, the ~~material~~ manufacturer shall specify outer boots that, in combination with the attached sock, meet all footwear design and performance requirements of the respective standard.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 09:39:12 EDT 2020

Committee Statement

Committee Statement: Editorial correction from material to manufacturer.
Response Message: SR-37-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 30-NFPA 1990-2020 [Section No. 6.1.5.2]

6.1.5.2

Footwear elements shall be permitted to be as follows:

(1) ~~Configuration~~ The footwear configuration shall be one of the following:

(a) ~~One configuration shall be full~~ Full footwear that meets all requirements of the respective standard.

(b) A ~~second configuration shall be the~~ combination of socks attached to the garment worn with an outer boot~~,~~ where the socks provide the principal protection barrier ~~protection~~ and the outer boots provide the primary physical protection.

~~A third configuration shall be the combination of regular work boots worn with a footwear cover that provides some physical protection, but is mainly for protection of the footwear, and further provides barrier protection.~~

(2) Footwear covers shall further be permitted as part of the configurations in 6.1.5.2(1)(a) and 6.1.5.2(1)(b) to allow for reducing contamination to either the full boot or outer boot.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Oct 15 10:43:09 EDT 2020

Committee Statement

Committee Statement: There is no defined regular work boot and this leaves ambiguity as to whether the user would select the correct level of protection.

Response Message: SR-30-NFPA 1990-2020

Public Comment No. 30-NFPA 1990-2020 [Section No. 6.1.5.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 31-NFPA 1990-2020 [Section No. 6.1.5.4]

6.1.5.4

Footwear ~~elements shall provide physical, moisture, and chemical protection not less than 140 mm (5.5 in.) in height when measured from the plane of the sole bottom.~~ height shall be a minimum of 150 mm (6 in.).

6.1.5.4.1

Footwear height shall be determined by measuring inside the footwear from the center of the insole at the heel up to a perpendicular reference line extending across the width of the footwear at the lowest point of the topline, excluding the tongue and gusset.

6.1.5.4.2

Removable insole inserts shall not be removed prior to measurement.

6.1.5.4.3

The chemical protection layer shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline in all areas with the exception of the area inside of and within 13 mm (0.5 in.) around the pull-up holes that fully penetrate the footwear from the outside to the inside. The height of the chemical protection layer in all parts of the boot shall be no less than 150 mm (6 in.) when measured as described in 6.1.5.4.1 .

6.1.5.4.4

Physical protection shall be continuous circumferentially to within 50 mm (2 in.) of the footwear topline in all areas with the exception of the tongue and gusset, and the area inside of and within 13 mm (0.5 in.) around pull-up holes that fully penetrate the footwear from the outside to the inside. The height of physical protection in all parts of the boot with the exception of the tongue and gusset shall be no less than 150 mm (6 in.) when measured as described in 6.1.5.4.1 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 15 10:48:30 EDT 2020

Committee Statement

Committee Statement: Aligning the method for measuring boot height and the height of protection with all other standards within the project.
Response Message: SR-31-NFPA 1990-2020

Public Comment No. 34-NFPA 1990-2020 [Section No. 6.1.5.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 4-NFPA 1990-2020 [Section No. 6.2.1.1]

6.2.1.1

NFPA 1991-certified ensembles shall ~~only~~ not be permitted to be constructed using an outer garment designed to be worn over the ~~suit~~ ensemble element ~~where such additional garments are necessary~~ to meet the base or optional ~~liquefied gas protection performance~~ requirements ~~specified in 7.1.8 or the optional flash fire protection performance requirements specified in 7.1.9~~ ~~.~~ of this standard.

~~**A.6.2.1.1**~~

~~The base layer of the garment, including the visor, should meet all of the base requirements of this standard. Outer garments are allowed only as solutions to the optional liquefied gas protection or optional chemical flash fire protection performance specifications.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 11:49:42 EDT 2020

Committee Statement

Committee Statement: Further clarify overgarments may not be used to meet either the base or optional requirements of this standard.

Response Message: SR-4-NFPA 1990-2020

Public Comment No. 290-NFPA 1990-2020 [Section No. 6.2.1.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 35-NFPA 1990-2020 [New Section after 6.3.2]

6.3.3

Ensembles shall be designed to accommodate the respirators specified by the manufacturer.

6.3.3.1

All respirators specified for use with encapsulated ensembles shall be open-circuit SCBA certified as compliant with NFPA 1981 or NFPA 1986 .

6.3.3.2

All respirators specified for use with nonencapsulated ensembles shall be certified by NIOSH as compliant with the *Statement of Standard for NIOSH CBRN SCBA Testing* , the *Statement of Standard for NIOSH CBRN APR Testing,* or the *Statement of Standard for NIOSH CBRN PAPR Testing* .

6.3.3.2.1

Where SCBAs are used as respirators, the SCBA specified by the manufacturer shall meet the requirements of either NFPA 1981 or NFPA 1986 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 15 11:54:47 EDT 2020

Committee Statement

Committee Statement: To provide clarity on the levels of respiratory protection suitable for use with encapsulated and non-encapsulated NFPA 1992 designs.

Response Message: SR-35-NFPA 1990-2020

Public Comment No. 122-NFPA 1990-2020 [New Section after 6.3.1]

Public Comment No. 121-NFPA 1990-2020 [New Section after 6.3.1]

Public Comment No. 123-NFPA 1990-2020 [New Section after 6.3.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 32-NFPA 1990-2020 [Section No. 6.3.4.2]

6.3.5.2

Where socks are used as part of an encapsulating or nonencapsulating NFPA 1992-certified ensemble, the ~~manufacturer shall permit the~~ use of any NFPA 1992-certified footwear element or any outer boot of the footwear element that is certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1994, or NFPA ~~1994~~ 1999 that also meets the minimum height requirement specified in ~~6.1.5.2~~ 6.1.5.4 shall be permitted .

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Oct 15 10:52:43 EDT 2020

Committee Statement

Committee Statement: Editorial change to allow this option, but not require the manufacturer to allow it and clarify the reference number. Also included NFPA 1999.

Response Message: SR-32-NFPA 1990-2020

Public Comment No. 55-NFPA 1990-2020 [Section No. 6.3.4.2]

Public Comment No. 31-NFPA 1990-2020 [Section No. 6.3.4.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 33-NFPA 1990-2020 [Section No. 6.3.4.3]

6.3.5.3

If the manufacturer chooses to allow choices of footwear as permitted in ~~6.3.4.1~~ 6.3.5.2 , then the product label shall have an additional warning as stipulated in Chapter 5.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 15 10:57:15 EDT 2020

Committee Statement

Committee Statement: Fixing incorrect reference section.
Response Message: SR-33-NFPA 1990-2020

Public Comment No. 56-NFPA 1990-2020 [Section No. 6.3.4.3]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 36-NFPA 1990-2020 [Section No. 6.4.1.3]

6.4.1.3

Ensembles shall be designed to accommodate the respirators specified by the manufacturer.

6.4.1.3.1

All respirators specified ~~in 6.4.1.2.1 for inclusion in~~ for use with Class 1, Class 2, ~~and~~ Class 2R, and Class 5 ensembles shall be open-circuit SCBA certified as compliant with NFPA 1981 or NFPA 1986 .

6.4.1.3.2

All respirators specified ~~by the ensemble manufacturer for inclusion in Class 1, Class 2, Class 2R,~~ for use with Class 3, Class 3R, Class 4, ~~and~~ or Class 4R ensembles shall be certified by NIOSH as compliant with the *Statement of Standard for NIOSH CBRN SCBA Testing*, the *Statement of Standard for NIOSH CBRN APR Testing,* or the *Statement of Standard for NIOSH CBRN PAPR Testing.* ~~All respirators shall cover the eyes, nose, and mouth at a minimum.~~

6.4.1.3.2.1

Where ~~the respirator specified in 16.1.7 is an open-circuit SCBA, the SCBA shall also be certified as compliant with~~ SCBAs are used as respirators, the SCBA specified by the manufacturer shall meet the requirements of either NFPA 1981 or NFPA 1986.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Oct 15 12:02:17 EDT 2020

Committee Statement

Committee Statement: To provide clarity on the levels of respiratory protection suitable for use with encapsulated and non-encapsulated NFPA 1994 designs.

Response Message: SR-36-NFPA 1990-2020

Public Comment No. 57-NFPA 1990-2020 [Sections 6.4.1.3.1.1, 6.4.1.3.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 34-NFPA 1990-2020 [Section No. 6.4.1.5.1]

6.4.1.5.1

Where socks are used as part of the protective ensemble, the manufacturer shall permit the use of any NFPA 1994-certified footwear element or any outer boot of the footwear element that is certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, or NFPA 1999 that also meets the minimum height requirement specified in ~~6.1.5.2~~ 6.1.5.4 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 15 11:03:11 EDT 2020

Committee Statement

Committee Statement: Fixing incorrect reference section.
Response Message: SR-34-NFPA 1990-2020

Public Comment No. 58-NFPA 1990-2020 [Section No. 6.4.1.5.1]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 74-NFPA 1990-2020 [New Section after 6.4.1.6.1]

6.4.2 Additional Design Requirements Specific to NFPA 1994 Class 5 Ensembles and Ensemble Elements.

6.4.2.1

Class 5 ensembles shall be nonencapsulating.

6.4.2.2

Class 5 garments shall meet the design requirements for technical rescue protective ensemble garments in Section 6.1 of NFPA 1951 with the following exceptions:

(1) Garments shall be permitted to be either a set of coat and pants or coveralls.

(2) Upper torso garments and coveralls shall be permitted to have an attached hood in lieu of a collar.

(3) Garments shall be permitted to have an attached or detachable liner.

(4) Garments shall be permitted to meet the optional requirements for blood-borne pathogen protective technical rescue garment ensemble elements in 6.1.1.15 of NFPA 1951 .

(5) If a garment has a detachable liner that is necessary to meet the performance requirements for Class 5 garments in Chapter 7 , the product label shall include a warning on the garment outer shell that indicates that the liner must be properly attached for compliance with the NFPA 1994 Class 5 requirements.

(6) Garments shall be permitted to have visibility markings.

6.4.2.3

Class 5 ensembles shall consist of the following additional elements:

(1) If a garment does not include an attached hood, the ensemble shall include a hood that is certified to the hood interface component requirements of NFPA 1971 or a hood that is certified to NFPA 1994 Class 3, Class 3R, Class 4, or Class 4R requirements, as well as the optional flash fire protection requirements of this standard.

(2) The ensemble shall include a helmet that is certified to NFPA 1951 , NFPA 1977 , or NFPA 1971 .

(3) The ensemble shall include gloves that are certified to NFPA 1951 , NFPA 1977 (work gloves only), or NFPA 1971 , or gloves that are certified to NFPA 1994 Class 3, Class 3R, Class 4, or Class 4R requirements, as well as the optional flash fire protection requirements of this standard.

(4) The ensemble shall include footwear that is certified to NFPA 1951 , NFPA 1971 , or NFPA 1977 , or footwear that is certified to this standard, as well as the optional flash fire protection requirements.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Nov 05 18:20:44 EST 2020

Committee Statement

Committee Statement: Specific criteria have been established for Class 5 ensembles that are primarily based on compliance to NFPA 1951 (technical rescue) and other standards specific to providing heat and flame resistance clothing (NFPA 1977 for wildland firefighting and NFPA 1971 for structural firefighting). These requirements also establish the elements that constitute the full ensemble.

Response Message: SR-74-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 75-NFPA 1990-2020 [Section No. 6.4.1.6.1]

6.4.1.6.1

Separate hood elements shall be permitted for Class 3, Class 3R, Class 4, Class 4R, and Class ~~4R~~ 5 ensembles only.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Nov 05 18:22:45 EST 2020

Committee Statement

Committee Statement: Specific criteria have been established for Class 5 ensembles that are primarily based on compliance to NFPA 1951 (technical rescue) and other standards specific to providing heat and flame resistance clothing (NFPA 1977 for wildland firefighting and NFPA 1971 for structural firefighting). These requirements also establish the elements that constitute the full ensemble.

Response Message: SR-75-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 28-NFPA 1990-2020 [Chapter 7 [Title Only]]

Performance Requirements ~~(NFPA 1991, NFPA 1992, and NFPA 1994)~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:07:10 EDT 2020

Committee Statement

Committee Statement: No longer necessary since NFPA 1999 is being removed.
Response Message: SR-28-NFPA 1990-2020

Public Comment No. 8-NFPA 1990-2020 [Chapter 7 [Title Only]]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 38-NFPA 1990-2020 [Section No. 7.1.1.1.2]

7.1.1.1.2

Ensembles providing protection from liquids shall be tested for liquid integrity in accordance with 8.2.3.1 using the test durations specified in Table 7.1.1.1.2, shall show no evidence of liquid penetration, and shall meet the following additional criteria as applicable in the design of the ensemble:

(1)* Where outer gloves are designed to be worn in conjunction with gloves attached to the ensemble, the outer gloves shall not ~~fill with~~ collect liquid.

A.7.1.1.1.2(1)

Outer gloves are permitted to absorb liquid and allow for drainage but must not fill with liquid during the test.

(2) Where outer boots are designed to be worn in conjunction with socks, the outer boots shall not collect liquid.

(3) Where ensembles include exhaust valves, no liquid shall ~~be noted~~ collect inside the ensembles next to the exhaust valves.

Table 7.1.1.1.2 Test Duration for Liquid Integrity Testing

Level	Test Duration (min)
Ultrahigh	60
High	20
Moderate	8
Low	4

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 10:01:53 EDT 2020

Committee Statement

Committee Statement: Providing clarification for types of gloves allowable and their observed performance.
Response Message: SR-38-NFPA 1990-2020

Public Comment No. 221-NFPA 1990-2020 [Section No. 7.1.1.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 44-NFPA 1990-2020 [Section No. 7.1.1.1.3]

7.1.1.1.3

Ensembles intended primarily for protection from particulates shall be tested for overall particulate inward leakage as specified in 8.2.4 and shall either show no visual particulate inward leakage on black indicator garments or, where fluorescence is observed, shall have no individual sampling area with an average surface concentration of particulates over ~~4.0~~ 6.0 μg/cm^2.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Oct 19 11:02:38 EDT 2020

Committee Statement

Committee Statement: Improvements were identified in the test method to provide for the quantification of inward penetration when uncertainty exists during visual observation. The suggested criterion is consistent with the level of toxic industrial chemical levels allowable for permeation testing. Earlier research has demonstrated that the approximate visual detection limit of deposited fluorescent powder is approximately 1.4 ug per cm2.

Response Message: SR-44-NFPA 1990-2020

Public Comment No. 329-NFPA 1990-2020 [Section No. 7.1.1.1.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 64-NFPA 1990-2020 [Section No. 7.1.2.4]

7.1.2.4 Permeation Resistance for Low Vapor Pressure Chemicals.

Where specified for permeation resistance against low vapor pressure chemicals, the garment, visor, glove, footwear, hood, and elastomeric interface materials and seams in and between these elements and components shall be tested for permeation resistance as specified in 8.3.1.3, and shall have an average cumulative permeation that does not exceed 6.0 μg/cm^2 in the 1-hour test period~~, and shall not exceed an average cumulative permeation for the first 15-minute interval of 2.0 μg/cm ^{2}~~ for each specified chemical and for each additional chemical or specific chemical for which the manufacturer is certifying the ensemble.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 11:24:00 EDT 2020

Committee Statement

Committee Statement: The 15-minute sampling period has been removed to be consistent with the new test method which is more effectively run for a 1-hour test duration.

Response Message: SR-64-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 39-NFPA 1990-2020 [Section No. 7.1.3.2.1]

7.1.3.2.1

Garment materials shall be tested for bursting strength as specified in 8.5.1 and shall have a bursting strength as specified in Table 7.1.3.2.1.

Table 7.1.3.2.1 Performance Requirements for Garment Material Burst Strength

Level	Burst Strength
High	≥200 N (≥45 lbf)
Moderate	≥156 N (≥35 lbf)
Low	≥135 N (~~≥25~~ ≥30 lbf)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 10:07:19 EDT 2020

Committee Statement

Committee Statement: Correcting a conversion error.
Response Message: SR-39-NFPA 1990-2020

Public Comment No. 182-NFPA 1990-2020 [Section No. 7.1.3.2.1]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 54-NFPA 1990-2020 [Sections 7.1.3.2.3, 7.1.3.2.4]

7.1.3.2.3

Garment materials shall be tested for cold ~~weather performance~~ temperature bending as specified in ~~8.5.12.1~~ 8.5.11.1 and shall have a bending moment not greater than 0.057 N·m (½ in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F).

~~**7.1.3.2.4**~~

~~Garment materials shall be tested for cold weather flexibility as specified in 8.5.12.3 and shall not show a pressure change of more than 100 Pa (2.1 lb/ft ^{2}).~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 10:04:13 EDT 2020

Committee Statement

Committee Statement: The cold weather flexing test was added because of concerns that the test apparatus for the existing

cold temperature performance test one was no longer available. However, the proposed new cold

weather flexing test applies a flexing mechanism that is particularly aggressive (8 flexes per second) that is not representative of use. The committee decided to maintain the current cold temperature performance test until a suitable alternative could be identified and verified.

Response Message: SR-54-NFPA 1990-2020

Public Comment No. 213-NFPA 1990-2020 [Section No. 7.1.3.2.4]

Public Comment No. 316-NFPA 1990-2020 [Section No. 7.1.3.2.3]

Public Comment No. 298-NFPA 1990-2020 [Section No. 7.1.3.2.4]

Public Comment No. 60-NFPA 1990-2020 [Section No. 7.1.3.2.3]

Public Comment No. 303-NFPA 1990-2020 [Global Input]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 40-NFPA 1990-2020 [Section No. 7.1.3.3.1 [Excluding any Sub-Sections]]

Garment seams, including seams to other ensemble elements or components, shall be tested for seam strength as specified in 8.5.3 and shall have a breaking strength as specified in Table 7.1.3.3.1.

Table 7.1.3.3.1 Performance Requirements for Garment Seam Strength

Level	Seam Strength
High	≥67 N/25 mm (≥~~30~~ 15 lbf/in.)
Moderate	≥34 N/25 mm (≥~~15~~ 7.6 lbf/in.)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 10:12:52 EDT 2020

Committee Statement

Committee Statement: Correcting conversion error.
Response Message: SR-40-NFPA 1990-2020

Public Comment No. 217-NFPA 1990-2020 [Section No. 7.1.3.3.1 [Excluding any Sub-Sections]]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 41-NFPA 1990-2020 [Section No. 7.1.3.3.2]

7.1.3.3.2

Garment closure assemblies shall be tested for closure strength as specified in 8.5.3 and shall have a breaking strength as specified in Table 7.1.3.3.2.

Table 7.1.3.3.2 Performance Requirements for Closure Assembly Strength

Level	Closure Assembly Strength
High	≥67 N/25 mm (≥~~30~~ 15 lbf/in.)
Moderate	≥34 N/25 mm (≥~~15~~ 7.6 lbf/in.)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 10:14:23 EDT 2020

Committee Statement

Committee Statement: Correcting a conversion error.
Response Message: SR-41-NFPA 1990-2020

Public Comment No. 218-NFPA 1990-2020 [Section No. 7.1.3.3.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 49-NFPA 1990-2020 [Section No. 7.1.3.4.1]

7.1.3.4.1

Where present, garment visor materials shall be tested for high-mass impact resistance as specified in ~~8.5.11~~ 8.5.10 and shall have no full-thickness punctures, cracks, holes, or fractures.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:37:11 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-49-NFPA 1990-2020

Public Comment No. 61-NFPA 1990-2020 [Section No. 7.1.3.4.1]

Public Comment No. 219-NFPA 1990-2020 [Section No. 7.1.3.4.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 50-NFPA 1990-2020 [Section No. 7.1.3.4.2]

7.1.3.4.2

Where present, garment visor materials shall be tested for cold temperature bending as specified in ~~8.5.12.2~~ 8.5.11.2 and shall not crack or show evidence of visible damage.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:39:13 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-50-NFPA 1990-2020

Public Comment No. 273-NFPA 1990-2020 [Section No. 7.1.3.4.2]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Nystrom, Ulf

I agree with the change of clause reference as such. But I believe the full clause 7.1.3.4.2 should be deleted because clause 7.1.3.4.1 high mass impact test is done at low temperature with the specific purpose that the low temp bending test (especially for rigid visors) would be redundant and deleted.

Second Revision No. 55-NFPA 1990-2020 [Sections 7.1.3.5.5, 7.1.3.5.6]

7.1.3.5.5

Where garments include elastomeric interface materials, each elastomeric interface material shall be tested for cold ~~weather performance~~ temperature bending as specified in ~~8.5.12.1~~ 8.5.11.1 and shall have a bending moment of not greater than 0.057 N·m (½ in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F).

~~**7.1.3.5.6**~~

~~Where garments include elastomeric interface materials, each elastomeric interface material shall be tested for cold weather flexibility as specified in 8.5.12.3 and shall not show a pressure change of more than 100 Pa (2.1 lb/ft ^{2}).~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 10:06:47 EDT 2020

Committee Statement

Committee Statement: The cold weather flexing test was added because of concerns that the test apparatus for the existing

cold temperature performance test one was no longer available. However, the proposed new cold

weather flexing test applies a flexing mechanism that is particularly aggressive (8 flexes per second) that is not representative of use. The committee decided to maintain the current cold temperature performance test until a suitable alternative could be identified and verified.

Response Message: SR-55-NFPA 1990-2020

Public Comment No. 274-NFPA 1990-2020 [Section No. 7.1.3.5.5]

Public Comment No. 317-NFPA 1990-2020 [Section No. 7.1.3.5.5]

Public Comment No. 275-NFPA 1990-2020 [Section No. 7.1.3.5.6]

Public Comment No. 300-NFPA 1990-2020 [Section No. 7.1.3.5.6]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 166-NFPA 1990-2020 [Section No. 7.1.3.6.1]

7.1.3.6.1*

Where specified, garment materials shall be tested for total heat loss as specified in 8.6.4.1 and shall have a total heat loss as specified in Table 7.1.3.6.1.

Table 7.1.3.6.1 Performance Requirements for Total Heat Loss

Level	**Total Heat Loss**
High	≥450 W/m^2
Moderate	~~≥200~~ ≥325 W/m^2
Low	≥200 W/m^2

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Wed Nov 11 08:39:48 EST 2020

Committee Statement

Committee Statement: Modify Performance Requirements for THL based upon updated guidance. Change description of THL levels to Low/Moderate/High and add the Moderate Level of 325 W/m2. This level is commensurate with barrier blocking hoods in NFPA 1971 and is more realistic for products with increased insulation compared to a standard NFPA 1951 ensemble (450 W/m2).

Response Message: SR-166-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 96-NFPA 1990-2020 [Section No. 7.1.3.6.2]

7.1.3.6.2*

Where specified, garment materials shall be tested for evaporative resistance as specified in 8.6.4.2 and shall have an evaporative resistance of not greater than 30 Pa·m^2/W.

A.7.1.3.6.2

Evaporative resistance also provides a measure of garment material breathability, but breathability is evaluated under different conditions compared to total heat loss (THL) and is intended to be complementary to THL test results to permit the AHJ to consider other factors in their selection of protective garments. Unlike THL, lower values of evaporative resistance indicate better levels of breathability. The maximum value of evaporative resistance for the purpose of making breathability claims is 30 Pa·m^2 /W.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 09:29:12 EST 2020

Committee Statement

Committee Statement: A portion of the annex from NFPA was left out of the first draft and has been supplemented to provide additional information.
Response Message: SR-96-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 42-NFPA 1990-2020 [Section No. 7.1.4.2.1]

7.1.4.2.1

Glove materials shall be tested for cut resistance under the loads provided in Table 7.1.4.2.1 as specified in 8.5.7 and shall have a blade travel distance of not less than 20 mm (0.8 in.).

Table 7.1.4.2.1 Test Loads for Glove Material Cut Resistance.

Level	Test Load
High	150 g (5.29 oz)
Moderate	75 g ~~(3.53 oz)~~ (2.64 oz)
Low	50 g (1.76 oz)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 10:17:11 EDT 2020

Committee Statement

Committee Statement: Correcting a conversion error.

Response Message: SR-42-NFPA 1990-2020

Public Comment No. 223-NFPA 1990-2020 [Section No. 7.1.4.2.1]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 56-NFPA 1990-2020 [Sections 7.1.4.2.3, 7.1.4.2.4]

7.1.4.2.3

Glove materials shall be tested for cold ~~weather performance~~ temperature bending as specified in ~~8.5.12.1~~ 8.5.11.1 and shall have a bending moment of not greater than 0.057 N·m (½ in.·lbf) at an angular deflection of 60 degrees at −25°C (−13°F).

~~**7.1.4.2.4**~~

~~Glove materials shall be tested for cold weather flexibility as specified in 8.5.12.3 and shall not show a pressure change of more than 100 Pa (2.1 lb/ft ^{2}).~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 10:08:31 EDT 2020

Committee Statement

Committee Statement: The cold weather flexing test was added because of concerns that the test apparatus for the existing

cold temperature performance test one was no longer available. However, the proposed new cold

weather flexing test applies a flexing mechanism that is particularly aggressive (8 flexes per second) that is not representative of use. The committee decided to maintain the current cold temperature performance test until a suitable alternative could be identified and verified.

Response Message: SR-56-NFPA 1990-2020

Public Comment No. 318-NFPA 1990-2020 [Section No. 7.1.4.2.3]

Public Comment No. 302-NFPA 1990-2020 [Section No. 7.1.4.2.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 52-NFPA 1990-2020 [Section No. 7.1.5.1.4]

7.1.5.1.4

Footwear soles and heels shall be tested for abrasion resistance as specified in ~~8.5.9.2~~ 8.5.9.1 and the volume loss shall be not greater than 250 mm^3.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:42:59 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-52-NFPA 1990-2020

Public Comment No. 281-NFPA 1990-2020 [Section No. 7.1.5.1.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 51-NFPA 1990-2020 [Section No. 7.1.5.1.5]

7.1.5.1.5

Footwear soles and heels shall be tested for slip resistance as specified in ~~8.6.7~~ 8.6.6 and shall have a coefficient of friction of 0.40 or greater.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:41:48 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-51-NFPA 1990-2020

Public Comment No. 59-NFPA 1990-2020 [Section No. 7.1.5.1.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 53-NFPA 1990-2020 [Section No. 7.1.5.4.6]

7.1.5.4.6

Footwear cover materials shall be tested for abrasion resistance as specified in ~~8.5.9.3~~ 8.5.9.2 and shall show no wear-through after 3000 cycles.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:44:58 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-53-NFPA 1990-2020

Public Comment No. 282-NFPA 1990-2020 [Section No. 7.1.5.4.6]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 78-NFPA 1990-2020 [Sections 7.1.8.1, 7.1.8.2, 7.1.8.3, 7.1.8.4]

7.1.8.1

Ensembles and garment elements shall be tested for overall flash protection as specified ~~by 8.4.3~~ in 8.4.4 and shall meet the following criteria:

(1) Afterflame times shall be no longer than ~~2~~ 5 seconds on any part of the ensemble or garment .

~~Subsequent testing by test subjects shall allow no liquid penetration.~~

(2) Where a hood with a visor is provided, test subjects shall ~~be allowed to~~ have a visual acuity of 20/100.

(3) Materials and structural seams of the ensembles or garment elements shall not exhibit a material or seam break that creates an opening greater than 51 mm (2 in.) as a result of simulated flash fire exposure.

(4) There shall be no evidence of dripping from any of the ensembles or garment elements.

7.1.8.1.1

Where manufacturers choose to report the predicted average percentage area of a burn injury, testing shall be performed using the options specified in 8.4.3 and provided as part of the technical data package.

~~**7.1.8.2**~~

~~Ensembles and garment elements shall be tested for overall flash survivability as specified by 8.4.4 and shall meet the following criteria:~~

~~The average predicted total area of burn injury shall be equal to or less than 40 percent.~~

~~Ensembles and garment elements shall show no afterflame times longer than 2 seconds.~~

~~Structural seams of the ensembles or garment elements shall not exhibit a seam failure that creates a seam opening of greater than 51 mm (2 in.) for the simulated flash fire exposure.~~

~~Closures of the ensembles or garment elements shall function (open only) after the simulated flash fire exposure.~~

~~There shall be no evidence of dripping from any of the ensemble or garment elements.~~

7.1.8.2

Garment materials and, where applicable, visor, glove, and footwear materials shall be tested for heat transfer performance (HTP) as specified in 8.4.2 and shall have an average HTP rating ~~of not less than 12 cal/cm ^{2}~~ as specified in Table 7.1.8.2 .

Table 7.1.8.2 Performance Requirements for Heat Transfer Performance

Level	Heat Transfer Performance
High	≥20 cal/cm ^{2}
Moderate	≥8 cal/cm ^{2}

7.1.8.3

Garment materials and, where applicable, visor, glove, footwear, and elastomeric interface materials shall be tested for flame resistance as specified in 8.4.1 and shall meet the following criteria:

(1) Materials shall not burn across a distance greater than 100 mm (4 in.).

(2) Materials shall not ~~sustain burning~~ burn for more than 2 seconds.

(3) Materials shall not melt and drip.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Nov 05 19:15:17 EST 2020

Committee Statement

Committee Statement: The current propane-based test has limitations for how and where it can be performed and is subject to test-to-test variations that result in uneven exposures of test ensembles. The proposed modifications combine the stability and calibration features of the ASTM F1930 instrumented manikin test, for providing a more uniform exposure but are combined with the types of additional areas of criteria that had been applied for the current flash fire test.

Thermal manikin test one has been adapted to retain the ASTM F1930 test equipment and set up for providing a consistent test platform, while the majority of the criteria provided for the original overall flash fire ensemble test have been substituted for original predicted body area burn injury measurements. The afterflame time has been increased from 2 to 5 seconds to account for the greater expected thermal energy to be delivered over a more consistent time duration for the simulated flash fire exposure. A maximum break open requirement has been incorporated to replace the use of post-flash exposure integrity test.

The removal of the overall flash fire survivability has been removed and is being replaced by a requirement that allows for the optional reporting of predicted burn injury area dataThe proposed test further afford the opportunity to make body burn injury predictions as may be required for certain types of ensembles given that the committee believes that the most important criteria allow for the garment to allow the individual operator to escape safely from any accidental flash fire and most ensembles for which these criteria are likely to apply would provide reasonable levels of protection .

A classification table has been added for the measurement of An adjustment to the HTP test has also been made to be commensurate with proposed changes in the manikin-based full ensemble and garment testing and accommodate the new Class 5 requirements.

The committee also added the option to report predicted burn injury as part of the overall ensemble flash test.

Response Message: SR-78-NFPA 1990-2020

Public Comment No. 226-NFPA 1990-2020 [Section No. 7.1.8.2]

Public Comment No. 321-NFPA 1990-2020 [Section No. 7.1.8.3]

Public Comment No. 327-NFPA 1990-2020 [Section No. 7.1.8]

Public Comment No. 291-NFPA 1990-2020 [Section No. 7.1.8.1]

Public Comment No. 297-NFPA 1990-2020 [Section No. 7.1.8.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Hirschey, Ryan C.

The proposed criteria establishes a reduction in user and product safety. It is expected the products achieving this criteria should be achieving the highest levels of performance; the criteria proposed does not meet these expectations.

Second Revision No. 43-NFPA 1990-2020 [Section No. 7.2.1]

7.2.1

NFPA 1994-certified ensembles and ensemble elements shall be tested in accordance with the general performance requirements in Section 7.1 as specified in Table 7.2.1.

Table 7.2.1 Performance Requirements for NFPA 1991-Certified Ensembles and Ensemble Elements

Requirement	Paragraph(s)	Ensemble	Gloves	Footwear
Ensemble Performance				
Inward vapor leakage	7.1.1.1.1	Ultrahigh	—	—
Liquid integrity	7.1.1.1.2	Ultrahigh	—	—
Overall function and integrity	7.1.1.1.4	Ultrahigh	—	—
Airflow capacity	7.1.1.1.5 7.1.1.1.5.1	Yes	—	—
Exhaust valve inward leakage	7.1.1.2.1	Yes	—	—
Exhaust valve mounting strength	7.1.1.2.2	Yes	—	—
External fitting integrity	7.1.1.3.1	Yes	—	—
External fitting pull-out strength, tethered	7.1.1.3.3	As applicable	—	—
External fitting pull-out strength, non-tethered	7.1.1.3.4	As applicable	—	—
Material and Seam Barrier Performance				
Ultrahigh permeation resistance	~~7.1.2.1.1~~ 7.1.2.1	Yes, for chemicals specified in 7.2.2		
Chemical warfare agent permeation resistance	7.1.2.3.1 7.1.2.3.2	Yes		
Liquid chemical penetration resistance	7.1.2.5.1	Yes *(See 7.2.3.)*	—	—
Garment Performance				
Material burst strength	7.1.3.2.1	High	—	—
Material puncture propagation tear resistance	7.1.3.2.2	High	—	—
Material cold ~~weather performance~~ temperature bending	7.1.3.2.3	Yes	—	—
~~Material cold weather flexibility~~	~~7.1.3.2.4~~	~~Yes~~	~~—~~	~~—~~
Seam strength	7.1.3.3.1	High	—	—
Closure strength	7.1.3.3.2	High	—	—
Visor Performance				
High-mass impact resistance	7.1.3.4.1	Yes	—	—
Cold temperature bending	7.1.3.4.2	Yes	—	—
Elastomeric Interface Material Performance				
Elongation	7.1.3.5.1	As applicable	—	—
Cut resistance	7.1.3.5.2	As applicable	—	—
Puncture resistance	7.1.3.5.3	As applicable	—	—
Ultimate tensile strength	7.1.3.5.4	As applicable	—	—
Cold ~~weather performance~~ temperature bending	7.1.3.5.5	As applicable	—	—
~~Cold weather flexibility~~	~~7.1.3.5.6~~	~~As applicable~~	~~—~~	~~—~~

Requirement	Paragraph(s)	Ensemble	Gloves	Footwear
Glove Performance				
Liquidtight integrity	7.1.4.1.1	Yes	Yes	—
Hand function	7.1.4.1.2	Low	Low	—
Cut resistance	7.1.4.2.1	High	High	—
Puncture resistance	7.1.4.2.2	High	High	—
Cold ~~weather performance~~ temperature bending	7.1.4.2.3	Yes	Yes	—
~~Cold weather flexibility~~	~~7.1.4.2.4~~	~~Yes~~	~~Yes~~	~~—~~
Footwear Performance				
Full Footwear Performance				
Liquidtight integrity	7.1.5.1.1	If used	—	Yes
Upper cut resistance	7.1.5.1.2	If used	—	Yes
Upper puncture resistance	7.1.5.1.3	If used	—	Yes
Sole/heel abrasion resistance	7.1.5.1.4	If used	—	Yes
Sole/heel slip resistance	7.1.5.1.5	If used	—	Yes
ASTM F2413 compliance	7.1.5.1.6	If used	—	Yes
Sock Performance				
General requirements	7.1.5.2.1	As applicable	—	—
Outer Boot Performance				
Liquidtight integrity	7.1.5.3.1	If used	—	—
Upper cut resistance	7.1.5.3.2	If used	—	—
Upper puncture resistance	7.1.5.3.3	If used	—	—
Sole/heel abrasion resistance	7.1.5.3.4	If used	—	—
Sole/heel slip resistance	7.1.5.3.5	If used	—	—
ASTM F2413 compliance	7.1.5.3.6	If used	—	—
General Flammability and High Heat Performance Requirements				
Flame impingement resistance	7.1.7.1	Yes	~~—~~ Yes	~~—~~ Yes
Flame break open resistance	7.1.7.2	Yes	~~—~~ Yes	~~—~~ Yes
Overall flash protection				
Overall flash fire protection	7.1.8.1	Optional	~~—~~ Optional	~~—~~ Optional
~~Overall flash fire survivability~~	~~7.1.8.2~~	~~Optional~~	~~—~~	~~—~~
Material heat transfer performance	~~7.1.8.3~~ 7.1.8.2	Optional (moderate)	~~—~~ Optional (moderate)	~~—~~ Optional (moderate)
Flame resistance	~~7.1.8.4~~ 7.1.8.3	Optional	~~—~~ Optional	~~—~~ Optional
Stealth Performance				
Color/visibility	7.1.8.1	Optional	—	—
Acoustic signature	7.1.8.2	Optional	—	—

Supplemental Information

File Name	Description	Approved
1990_SR_43_Table_7.2.1.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Oct 19 10:27:06 EDT 2020

Committee Statement

Committee Statement: Paragraph 7.2.1 was corrected to indication application to NFPA 1991 not NFPA 1994. The table of criteria has been further updated to reflect changes in other performance requirements made as the result of other second revisions. The committee decided to retain the flame break-open test, remove both the cold weather flexibility and overall flash fire survivability test requirements, and not add the proposed small scale flash fire exposure test requirement. For the latter proposal, the committee chose to hold that requirement until further information is presented to support its inclusion in the standard.

Response Message: SR-43-NFPA 1990-2020

Public Comment No. 305-NFPA 1990-2020 [Section No. 7.2.1]

Public Comment No. 265-NFPA 1990-2020 [Section No. 7.2.1]

Public Comment No. 276-NFPA 1990-2020 [Section No. 7.2.1]

Public Comment No. 32-NFPA 1990-2020 [Section No. 7.2.1]

Public Comment No. 326-NFPA 1990-2020 [Global Input]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
26 Affirmative All
0 Affirmative with Comments
2 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Fithian, William A.

Following edits are needed: 7.1.2 - NFPA 1994 should be NFPA 1991; and Stealth Performance references in table should be 7.1.9.1 and 7.1.9.2 and not 7.1.8.1 and 7.1.8.2

Nystrom, Ulf

The first sentence of 7.2.1 still incorrectly refers to NFPA 1994. Delete the visor material requirement to be tested for cold temperature bending. Low temperature performance for visors is covered by the high mass impact test.

Second Revision No. 138-NFPA 1990-2020 [Section No. 7.2.4]

7.2.4 Optional Liquefied Gas Protection Performance Requirements.

NFPA 1991-certified garment, glove, and footwear element materials shall be tested for liquefied gas permeation resistance as specified in ~~Section 8.6~~ 8.3.1.1 and shall not show signs of damage ~~and not~~ nor exceed a cumulative permeation of 60 mg/m^2 (6.0 μg/cm^2) for the following list of gaseous industrial chemicals:

(1) Ammonia, anhydrous (NH_3), CAS No. 7664-41-7, >95 percent, w/w

(2) Chlorine (Cl_2), CAS No. 7782-50-5, >95 percent, w/w

(3) Ethylene oxide (ETO), CAS No. 75-21-8, >95 percent, w/w

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:49:08 EST 2020

Committee Statement

Committee Statement: Fixing referenced test method.
Response Message: SR-138-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 105-NFPA 1990-2020 [Section No. 7.3.1]

7.3.1

NFPA 1992-certified ensembles and ensemble elements shall be tested ~~in accordance with~~ to the general performance requirements in Section 7.1 as specified in Table 7.3.1.

Table 7.3.1 Performance Requirements for NFPA 1992-Certified Ensembles and Ensemble Elements

Requirement	Paragraph(s)	Ensemble	Garment	Gloves	Footwear
Ensemble Performance					
~~Inward vapor leakage~~ Liquid integrity	~~7.1.1.1.1~~ 7.1.1.1.2	High	—	—	—
Overall function and integrity	7.1.1.1.4	High	—	—	—
Airflow capacity	7.1.1.1.5 7.1.1.1.5.2	As applicable	—	—	—
Exhaust valve mounting strength	7.1.1.2.2	~~Yes~~ As applicable	—	—	—
External fitting integrity	7.1.1.3.2	As applicable	—	—	—
External fitting pull-out strength, tethered	7.1.1.3.3	As applicable	—	—	—
External fitting pull-out strength, non-tethered	7.1.1.3.4	As applicable	—	—	—
Material and Seam Barrier Performance					
Liquid chemical penetration resistance	~~7.1.2.5.1~~ 7.1.2.5	Yes, for chemicals specified in 7.3.2 and 7.3.3			
Garment Performance					
Overall function and integrity	7.1.3.1.1	~~—~~ Addressed in 7.1.1.1.4	Yes	—	—
Material burst strength	7.1.3.2.1	Low	Low	—	—
Material puncture propagation tear resistance	7.1.3.2.2	Low	Low	—	—
Material cold ~~weather performance~~ temperature bending	7.1.3.2.3	Yes	Yes	—	—
~~Material cold weather flexibility~~	~~7.1.3.2.4~~	~~Yes~~	~~Yes~~	~~—~~	~~—~~
Seam strength	7.1.3.3.1	Moderate	Moderate	—	—
Closure strength	7.1.3.3.2	Moderate	Moderate	—	—
Visor Performance					
High-mass impact resistance	7.1.3.4.1	~~Yes~~ If present	If present	—	—
Cold temperature bending	7.1.3.4.2	~~Yes~~ If present	If present	—	—
Elastomeric Interface Material Performance					
Elongation	7.1.3.5.1	If present	If present	—	—
Cut resistance	7.1.3.5.2	If present	If present	—	—
Puncture resistance	7.1.3.5.3	If present	If present	—	—
Ultimate tensile strength	7.1.3.5.4	If present	If present	—	—
Cold ~~weather performance~~ temperature bending	7.1.3.5.5	If present	If present	—	—
~~Cold weather flexibility~~	~~7.1.3.5.6~~	~~If present~~	~~If present~~	~~—~~	~~—~~
Garment Material Breathability Performance					

Requirement	Paragraph(s)	Ensemble	Garment	Gloves	Footwear
Total heat loss	7.1.3.6.1	~~Report~~ Moderate (report only if breathability is claimed per 7.3.4)	~~Report~~ Moderate (report only if breathability is claimed per 7.3.4)	—	—
Evaporative resistance	7.1.3.6.2	~~Report~~ Yes (report only if breathability is claimed per 7.3.4)	~~Report~~ Yes (report only if breathability is claimed per 7.3.4)	—	—
Glove Performance					
Liquidtight integrity	7.1.4.1.1	Yes	—	Yes	—
Hand function	7.1.4.1.2	High	—	High	—
Cut resistance	7.1.4.2.1	Low	—	Low	—
Puncture resistance	7.1.4.2.2	Low	—	Low	—
Cold ~~weather performance~~ temperature bending	7.1.4.2.3	Yes	—	Yes	—
~~Cold weather flexibility~~	~~7.1.4.2.4~~	~~Yes~~	~~—~~	~~Yes~~	~~—~~
Footwear Performance					
Full Footwear Performance					
Liquidtight integrity	7.1.5.1.1	If used	—	—	Yes
Upper cut resistance	7.1.5.1.2	If used	—	—	Yes
Upper puncture resistance	7.1.5.1.3	If used	—	—	Yes
Sole/heel abrasion resistance	7.1.5.1.4	If used	—	—	Yes
Sole/heel slip resistance	7.1.5.1.5	If used	—	—	Yes
ASTM F2413 compliance	7.1.5.1.6	If used	—	—	Yes
Sock Performance					
General requirements	7.1.5.2.1	If used	As applicable	—	—
Outer Boot Performance					
Liquidtight integrity	7.1.5.3.1	If used	—	—	Yes
Upper cut resistance	7.1.5.3.2	If used	—	—	Yes
Upper puncture resistance	7.1.5.3.3	If used	—	—	Yes
Sole/heel abrasion resistance	7.1.5.3.4	If used	—	—	Yes
Sole/heel slip resistance	7.1.5.3.5	If used	—	—	Yes
ASTM F2413 compliance	7.1.5.3.6	If used	—	—	Yes
Footwear Cover Performance					
Liquidtight integrity	7.1.5.4.1	If used	—	—	Yes
Upper cut resistance	7.1.5.4.2	If used	—	—	Yes
Upper puncture resistance	7.1.5.4.3	If used	—	—	Yes
Cold ~~weather performance~~ temperature bending	7.1.5.4.4	If used	—	—	Yes
~~Cold weather flexibility~~	~~7.1.5.4.5~~	~~If used~~	~~—~~	~~—~~	~~Yes~~
Abrasion Resistance	7.1.5.4.6	If used	—	—	Yes

Requirement	Paragraph(s)	Ensemble	Garment	Gloves	Footwear
Slip Resistance	7.1.5.4.7	If used	—	—	Yes
Hood Performance					
General requirements	7.1.6.1	As applicable	As applicable	—	—
Overall Flash Protection Performance					
Overall flash fire protection	7.1.8.1	Optional	Optional	—	—
~~Overall flash fire survivability~~	~~7.1.8.2~~	~~Optional~~	~~Optional~~	—	—
Material heat transfer performance	~~7.1.8.3~~ 7.1.8.2	Optional (moderate)	Optional (moderate)	—	—
Flame resistance	~~7.1.8.4~~ 7.1.8.3	Optional	Optional	—	—
Stealth Performance					
Color/visibility	7.1.8.1	Optional	—	—	—
Acoustic signature	7.1.8.2	Optional	—	—	—

Supplemental Information

File Name	Description	Approved
1990_SR_105_Table_7.3.1.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 13:40:22 EST 2020

Committee Statement

Committee Statement: The table of criteria has been further updated to reflect changes in other performance requirements made as the result of other second revisions. Minimum requirements have been added for breathability, if claimed by the manufacturer. The committee decided to remove both the cold weather flexibility and overall flash fire survivability test requirements.

Response Message: SR-105-NFPA 1990-2020

Public Comment No. 312-NFPA 1990-2020 [Section No. 7.3.1]

Public Comment No. 309-NFPA 1990-2020 [Section No. 7.3.1]

Public Comment No. 33-NFPA 1990-2020 [Section No. 7.3.1]

Public Comment No. 266-NFPA 1990-2020 [Section No. 7.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Fithian, William A.

Following edits are needed: Stealth Performance references in table should be 7.1.9.1 and 7.1.9.2 and not 7.1.8.1 and 7.1.8.2

Second Revision No. 94-NFPA 1990-2020 [Section No. 7.3.4]

7.3.4

Where the manufacturer designates NFPA 1992-certified garments or hoods as “breathable,” the following shall apply *(see A.7.1.3.6.1)*:

(1) The total heat loss shall be measured for the garment and hood materials in the ensemble as specified in 8.6.4.1 and meet at least the “Low” level of performance specified in Table 7.1.3.6.1 .

(2) The evaporative resistance shall be measured for the garment and hood material in the ensemble as specified in 8.6.4.2 and meet the performance requirement specified in 7.1.3.6.2 .

(3) The results for the total heat loss and evaporative resistance shall be provided in the technical data package.

(4) “Breathable (see manufacturer’s technical data package)” shall be added to the product label as specified in 5.3.1.1.1.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 09:19:44 EST 2020

Committee Statement

Committee Statement: The change reflects the need for the garment material to meet a specific minimum requirement if the manufacturer claims that the garment is breathable.

With the addition of an intermediate level for THL, the Moderate level has become the Low level (≥200 W/m2).

Response Message: SR-94-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 60-NFPA 1990-2020 [Section No. 7.3.5]

7.3.5

Where socks are used as part of a NFPA 1992-certified ensemble and the manufacturer permits the use of any outer boot of the footwear element that is certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, or NFPA 1999, the outer boot of the footwear element shall meet the minimum height requirement specified in ~~16.4.3~~ 6.1.5.4 and cut resistance performance requirement specified in ~~17.7.4.3~~ 7.1.5.1.2 and 7.1.5.3.2 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 10:56:36 EDT 2020

Committee Statement

Committee Statement: Correcting section references.
Response Message: SR-60-NFPA 1990-2020

Public Comment No. 277-NFPA 1990-2020 [Section No. 7.3.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 106-NFPA 1990-2020 [Section No. 7.4.1]

7.4.1

NFPA 1994-certified ensembles shall be tested ~~in accordance with~~ to the general performance requirements ~~from~~ of Section 7.1 as specified in Table 7.4.1.

Table 7.4.1 Performance Requirements for NFPA 1994-Certified Ensembles

Requirement	Paragraph(s)	Class 1	Class 2 and Class 2R	Class 3 and Class 3R	C Cl
Ensemble Performance					
Inward vapor leakage	7.1.1.1.1	High	Moderate	Low	
Liquid integrity	7.1.1.1.2	High	High	Moderate	
Inward particle leakage	7.1.1.1.3	—	—	—	
Overall function and integrity	7.1.1.1.4	High	High	Moderate	
Airflow capacity	7.1.1.1.5 ~~7.1.1.1.5.1~~ 7.1.1.1.5.2	Yes, if encapsulating	~~Yes~~ —	—	
Exhaust valve inward leakage	7.1.1.2.1	~~Yes~~ As applicable	~~Yes~~ As applicable	~~—~~ As applicable	- app
Exhaust valve mounting strength	7.1.1.2.2	As applicable	As applicable	As applicable	app
External fitting integrity (gastight integrity)	7.1.1.3.1	As applicable	~~As applicable~~ —	—	
External fitting integrity (liquidtight integrity)	7.1.1.3.2	—	~~—~~ As applicable	As applicable	- app
External fitting pull-out strength, tethered	7.1.1.3.3	As applicable	As applicable	As applicable	app
External fitting pull-out strength, non-tethered	7.1.1.3.4	As applicable	As applicable	As applicable	app
Material and Seam Barrier Performance					
Toxic industrial chemical permeation resistance	~~7.1.2.1.2~~ 7.1.2.2	Yes, for chemicals specified in 7.4.2	Yes, for chemicals specified in 7.4.3	Yes, for chemicals specified in 7.4.3	
Chemical warfare agent permeation resistance	7.1.2.3.1 7.1.2.3.2	Yes	Yes	Yes	
Low vapor pressure chemical permeation resistance	~~7.1.2.4.1~~ 7.1.2.4	Yes, for chemical~~s~~ specified in 7.4.4	—	—	
Viral penetration resistance	~~7.1.2.6.1~~ 7.1.2.6	—	Yes	Yes	
Liquid repellency resistance	7.1.2.7	—	—	—	
Garment Performance					
Material burst strength	7.1.3.2.1	High	Moderate High (Class 2R)	Low Moderate (Class 3R)	Mo (Cl
Material puncture propagation tear resistance	7.1.3.2.2	High	Moderate High (Class 2R)	Low Moderate (Class 3R)	Mo (Cl
Material cold ~~weather performance~~ temperature bending	7.1.3.2.3	Yes	Yes	Yes	

Requirement	Paragraph(s)	Class 1	Class 2 and Class 2R	Class 3 and Class 3R	C Cl
~~Material cold weather flexibility~~	~~7.1.3.2.4~~	~~Yes~~	~~Yes~~	~~Yes~~	
Seam strength	7.1.3.3.1	High	Moderate	Moderate	Mc
Closure strength	7.1.3.3.2	High	Moderate	Moderate	Mc
Visor Performance					
High-mass impact resistance	7.1.3.4.1	Yes	Yes	Yes	
Cold temperature bending	7.1.3.4.2	Yes	Yes	Yes	
Elastomeric Interface Material Performance					
Elongation	7.1.3.5.1	As applicable	As applicable	As applicable	ap
Cut resistance	7.1.3.5.2	As applicable	As applicable	As applicable	ap
Puncture resistance	7.1.3.5.3	As applicable	As applicable	As applicable	ap
Ultimate tensile strength	7.1.3.5.4	As applicable	As applicable	As applicable	ap
Cold ~~weather performance~~ temperature bending	7.1.3.5.5	As applicable	As applicable	As applicable	ap
~~Cold weather flexibility~~	~~7.1.3.5.6~~	~~As applicable~~	~~As applicable~~	~~As applicable~~	~~ap~~
Garment Material Breathability Performance					
Total heat loss	7.1.3.6.1	—	~~Report~~ Moderate (report only if breathability is claimed per 7.3.4)	~~Moderate~~ Low	
Evaporative resistance	7.1.3.6.2	—	~~Report~~ Yes (report only if breathability is claimed per 7.3.4)	Yes	
Glove Performance					
Liquidtight integrity	7.1.4.1.1	Yes	Yes	Yes	
Hand function	7.1.4.1.2	Moderate	Moderate	High	
Cut resistance	7.1.4.2.1	Moderate	Moderate	Low	
Puncture resistance	7.1.4.2.2	Moderate	Moderate	Low	
Cold ~~weather performance~~ temperature bending	7.1.4.2.3	Yes	Yes	Yes	
~~Cold weather flexibility~~	~~7.1.4.2.4~~	~~Yes~~	~~Yes~~	~~Yes~~	
Footwear Performance					
Full Footwear Performance					
Liquidtight integrity	7.1.5.1.1	Yes	Yes	Yes	
Upper cut resistance	7.1.5.1.2	Yes	Yes	Yes	
Upper puncture resistance	7.1.5.1.3	Yes	Yes	Yes	

Requirement	**Paragraph(s)**	**Class 1**	**Class 2 and Class 2R**	**Class 3 and Class 3R**	**C Cl**
Sole/heel abrasion resistance	7.1.5.1.4	Yes	Yes	Yes	
Sole/heel slip resistance	7.1.5.1.5	Yes	Yes	Yes	
ASTM F2413 compliance	7.1.5.1.6	Yes	Yes	—	
Sock Performance					
General requirements	7.1.5.2.1	As applicable	As applicable	As applicable	ap
Outer Boot Performance					
Liquidtight integrity	7.1.5.1.1	Yes	Yes	Yes	
Upper cut resistance	7.1.5.1.2	Yes	Yes	Yes	
Upper puncture resistance	7.1.5.1.3	Yes	Yes	Yes	
Sole/heel abrasion resistance	7.1.5.1.4	Yes	Yes	Yes	
Sole/heel slip resistance	7.1.5.1.5	Yes	Yes	Yes	
ASTM F2413 compliance	7.1.5.1.6	Yes	Yes	—	
Footwear Cover Performance					
Liquidtight integrity	7.1.5.4.1	If used	If used	If used	If
Upper cut resistance	7.1.5.4.2	If used	If used	If used	If
Upper puncture resistance	7.1.5.4.3	If used	If used	If used	If
Cold ~~weather performance~~ temperature bending	7.1.5.4.4	If used	If used	If used	If
~~Cold weather flexibility~~	~~7.1.5.4.5~~	~~If used~~	~~If used~~	~~If used~~	~~If~~
Abrasion resistance	7.1.5.4.6	If used	If used	If used	If
Slip resistance	7.1.5.4.7	If used	If used	If used	If
General Flammability and High Heat Performance Requirements					
Flame impingement resistance	7.1.7.1	Yes, for garment, visor, glove, full footwear, outer boot, and hood, as applicable	—	—	
Flame break open resistance	7.1.7.2	Yes, for garment, visor, glove, full footwear, outer boot, and hood, as applicable	—	—	
Overall flash protection					
Overall flash fire protection	7.1.8.1	Optional	Optional	Optional	O
~~Overall flash fire survivability~~	~~7.1.8.2~~	~~Optional~~	~~Optional~~	~~Optional~~	~~Op~~
Material heat transfer performance	~~7.1.8.3~~ 7.1.8.2	Optional, Moderate	Optional, Moderate	Optional, Moderate	Op Mc

Requirement	Paragraph(s)	Class 1	Class 2 and Class 2R	Class 3 and Class 3R	C Cl
Flame resistance	~~7.1.8.4~~ 7.1.8.3	Optional	Optional	Optional	O
Stealth Performance					
Color/visibility	7.1.8.1	Optional	Optional	Optional	O
Acoustic signature	7.1.8.2	Optional	Optional	Optional	O

Supplemental Information

File Name	Description	Approved
1990_SR_106_Table_7.4.1.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 13:50:48 EST 2020

Committee Statement

Committee Statement: The table has been corrected to address omissions or mistakes found in the first draft. The table of criteria has been further updated to reflect changes in other performance requirements made as the result of other second revisions. The committee decided to retain the flame break-open test and remove both the cold weather flexibility and overall flash fire survivability test requirements. The committee further made a decision not to include a liquid integrity requirement for Class 5 ensembles.

With the addition of an intermediate level for THL, the Moderate level now represents ≥325 W/m2 and the Low level represents ≥200 W/m2. Therefore, class 3 products will be Low, class 4 products will be High, and class 5 products will be Moderate.

Response Message: SR-106-NFPA 1990-2020

Public Comment No. 325-NFPA 1990-2020 [Section No. 7.4.1]

Public Comment No. 253-NFPA 1990-2020 [Section No. 7.4.1]

Public Comment No. 267-NFPA 1990-2020 [Section No. 7.4.1]

Public Comment No. 323-NFPA 1990-2020 [Section No. 7.1.1.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Fithian, William A.

Following edits are needed: Stealth Performance references in table should be 7.1.9.1 and 7.1.9.2 and not 7.1.8.1 and 7.1.8.2

Second Revision No. 61-NFPA 1990-2020 [Section No. 7.4.5]

7.4.5

If used as part of a sock, NFPA 1994-certified Class 1 garment materials shall be tested for bursting strength as specified in ~~Section 18.9~~ 8.5.1 and shall have a bursting strength of not less than 156 N (35 lbf).

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 10:58:42 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-61-NFPA 1990-2020

Public Comment No. 279-NFPA 1990-2020 [Section No. 7.4.5]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 62-NFPA 1990-2020 [Sections 7.4.6, 7.4.7, 7.4.8]

7.4.6

If used as part of a sock, NFPA 1994-certified Class 1 garment materials shall be tested for puncture propagation tear resistance as specified in ~~Section 18.10~~ 8.5.2 and shall have a puncture propagation tear resistance of not less than 31 N (7 lbf).

7.4.7

If used as part of a sock, NFPA 1994-certified Class 2R garment materials shall be tested for bursting strength as specified in ~~Section 18.9~~ 8.5.1 and shall have a bursting strength of not less than 156 N (35 lbf).

7.4.8

If used as part of a sock, NFPA 1994-certified Class 2R garment materials shall be tested for puncture propagation tear resistance as specified in ~~Section 18.10~~ 8.5.2 and shall have a puncture propagation tear resistance of not less than 31 N (7 lbf).

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 11:00:28 EDT 2020

Committee Statement

Committee Statement: Correcting section reference.
Response Message: SR-62-NFPA 1990-2020

Public Comment No. 280-NFPA 1990-2020 [Sections 7.4.6, 7.4.7, 7.4.8]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 95-NFPA 1990-2020 [Section No. 7.4.9]

7.4.9

Where the manufacturer designates the garment and hood portions of NFPA 1994-certified Class 2 and Class 2R ensembles as "breathable," the following shall apply *(see A.7.1.3.6.1)*:

(1) The total heat loss shall be measured for the garment and hood materials in the ensemble as specified in 8.6.4.1 and meet at least the "Low" level of performance specified in Table 7.1.3.6.1 .

(2) The evaporative resistance shall be measured for the garment and hood material in the ensemble as specified in 8.6.4.2 and meet the performance requirement specified in 7.1.3.6.2 .

(3) The results for the total heat loss and evaporative resistance shall be provided in the technical data package.

(4) "Breathable (see manufacturer's technical data package)" shall be added to the product label as specified in 5.4.1.3.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 09:25:38 EST 2020

Committee Statement

Committee Statement: The change reflects the need for the garment material to meet a specific minimum requirement if the manufacturer claims that the garment is breathable.

With the addition of an intermediate level for THL, the Moderate level has become the Low level (≥200 W/m2).

Response Message: SR-95-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 76-NFPA 1990-2020 [New Section after 7.4.10]

7.4.11

Class 5 garments shall meet the performance requirements specified for technical rescue protective ensemble garment elements specified in Section 7.1 of NFPA 1951 .

7.4.11.1

Class 5 garments shall be permitted to meet the optional performance requirements for blood-born pathogen protective technical rescue garments specified in Section 7.2 of NFPA 1951 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Nov 05 18:26:52 EST 2020

Committee Statement

Committee Statement: Garments that are certified to NFPA 1951 provide the foundation of necessary requirements for Class 5 garments when combined with the additional requirements specified proposed in this standard.

Response Message: SR-76-NFPA 1990-2020

Public Comment No. 333-NFPA 1990-2020 [Global Input]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 63-NFPA 1990-2020 [Section No. 7.4.10]

7.4.10

Where socks are used as part of a NFPA 1992-certified ensemble and the manufacturer permits the use of any outer boot of the footwear element that is certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, or NFPA 1999, the outer boot of the footwear element shall meet the minimum height requirement specified in ~~16.4.3~~ 6.1.5.4 and cut resistance performance requirement specified in ~~17.7.4.3~~ 7.1.5.1.2 and 7.1.5.3.2 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 11:01:56 EDT 2020

Committee Statement

Committee Statement: Correcting section references and changing reference to NFPA 1994 not NFPA 1992.

Response Message: SR-63-NFPA 1990-2020

Public Comment No. 331-NFPA 1990-2020 [Section No. 7.4.10]

Public Comment No. 278-NFPA 1990-2020 [Section No. 7.4.10]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 29-NFPA 1990-2020 [Chapter 8 [Title Only]]

Test Methods ~~(NFPA 1991, NFPA 1992, and NFPA 1994)~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 13 14:10:09 EDT 2020

Committee Statement

Committee Statement: No longer necessary since NFPA 1999 is being removed.
Response Message: SR-29-NFPA 1990-2020

Public Comment No. 9-NFPA 1990-2020 [Chapter 8 [Title Only]]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf

Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 66-NFPA 1990-2020 [Section No. 8.1.3]

8.1.3 Flexural Fatigue Procedure for Garment Materials.

8.1.3.1

Samples shall be subjected to flexural fatigue in accordance with ASTM/F392M F392, *Standard Practice for Conditioning Flexible Barrier Materials for Flex Durability*, with the following modifications:

(1) In lieu of the flexing conditions provided by ASTM F392/F392M, test specimens for class types other than Class Type R shall have a flex period of 100 cycles at 45 cycles per minute. A cycle shall be full flex and twisting action.

(2) In lieu of the flexing conditions provided by ASTM F392/F392M, test specimens for Class Type R shall have a flex period of 1000 cycles at 45 cycles per minute. A cycle shall be a full flex and twisting action.

(3) Anisotropic materials shall be tested in both machine and transverse directions.

(4) ~~All~~ Samples for flexing shall consist of all the layers of garment material in the ~~ensemble shall be present during~~ proper order in which they appear in the ensemble with the outermost layer facing the outside during flex conditioning.

8.1.3.2

Preconditioning shall be performed according to the sequence specified in the test methods of this chapter.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 11:56:56 EDT 2020

Committee Statement

Committee Statement: The intent of the change is to clarify that all multiple garment layers, if present, are all flexed at the same time during the conditioning.

Response Message: SR-66-NFPA 1990-2020

Public Comment No. 293-NFPA 1990-2020 [Section No. 8.1.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 67-NFPA 1990-2020 [Section No. 8.1.4]

8.1.4 Abrasion Procedure.

Samples shall be abraded in accordance with ASTM D4157, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)*, under the following conditions:

(1) The tension weight used shall be 2.3 kg (5 lb).

(2) The head weight used shall be 1.6 kg (3.5 lb).

(3) The abradant types shall be as follows:

(a) For NFPA 1991-compliant ensembles, the abradant for the outer surface shall be 80 grit abradant trimite open coat or equivalent.

(b) For NFPA 1992- and NFPA 1994-compliant elements, the abradant shall be 600 grit ultrafine ~~silicone~~ silicon carbide.

(4) The specimen shall be as shown in Figure 8.1.4.

(5) The abrasion cycles shall be as follows:

(a) For NFPA 1991- and NFPA 1992-compliant ensembles, the outer surface shall be abraded for 25 continuous cycles.

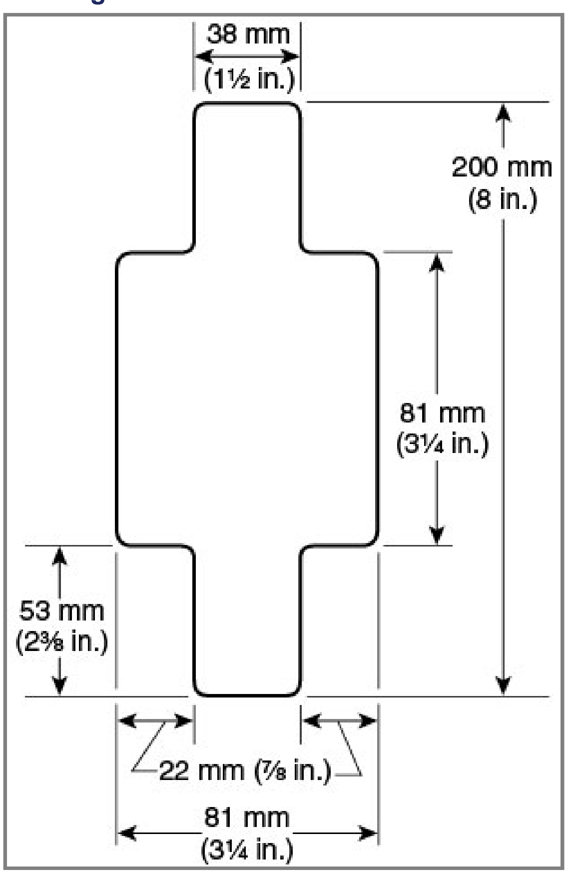
(b) NFPA 1994-compliant ensemble elements shall be as follows:

i. Standard class type specimens shall be abraded for 10 continuous cycles.

ii. Class Type R specimens shall be abraded for 100 continuous cycles.

(6) ~~All layers~~ If ~~of~~ the ~~ensemble element material shall be~~ element sample consists of separable layers, all the layers shall be subjected to ~~the~~ abrasion conditioning with the outermost layer as the exterior layer .

Figure 8.1.4 Specimen Configuration.



Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Oct 20 12:00:06 EDT 2020

Committee Statement

Committee Statement: The suggested change clarifies the handling of multiple layered ensemble samples and corrects a spelling error.

Response Message: SR-67-NFPA 1990-2020

Public Comment No. 295-NFPA 1990-2020 [Section No. 8.1.4]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

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O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 69-NFPA 1990-2020 [Section No. 8.2.1.1]

8.2.1.1 Application.

This test method shall apply to NFPA 1991- and NFPA 1994-compliant encapsulating Class 1 ensembles.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 03 11:49:00 EST 2020

Committee Statement

Committee Statement: Gastight integrity only applies to fully encapsulating 1991 and 1994 Class 1

Response Message: SR-69-NFPA 1990-2020

Public Comment No. 175-NFPA 1990-2020 [Section No. 8.2.1.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

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Clifford, Brian J.

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Harkness, Allen Ira
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O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 80-NFPA 1990-2020 [New Section after 8.2.2.4.4.2]

8.2.2.4.4.3

The test subject shall be identified by a unique number or other designation.

8.2.2.4.4.4

The test subject's body measurements and clothing sizes shall be taken and shall include, but not be limited to, the subject's height, weight, neck circumference, chest circumference, waist circumference, sleeve length, inseam, glove size, shoe size, and facepiece size.

8.2.2.4.4.5

Photographs shall be taken of the test subject wearing the test ensemble that show the front, back, left, and right sides while maintaining the anonymity of that test subject.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Nov 05 21:12:06 EST 2020

Committee Statement

Committee Statement: Greater documentation is needed to match the ensemble size with the individual test subjects performing the test.

Response Message: SR-80-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

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Thompson, Donald B.

Affirmative All

Baxter, Christina M.

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Hedstrom, Olaf
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Kennedy, Jeffrey
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O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 81-NFPA 1990-2020 [Section No. 8.2.2.8.3]

8.2.2.8.3

A spreadsheet shall be prepared that shows all the test measurements and calculations, including at least the following:

(1) The MeS vapor exposure concentration for PAD lot qualification

(2) The exposure time used for PAD lot qualification

(3) The measured MeS mass ~~on~~ for each PAD used for PAD lot qualification

(4) Each ~~individual~~ test subject and the average PAD uptake rate

(5) The measured MeS mass ~~on~~ for each PAD used in the dressing room, stage 1 undressing room, and stage 2 undressing room

(6) The measured MeS mass ~~on~~ for each PAD placed on the test subject

(7) The calculated vapor dosage for each PAD placed on the test subject

(8) The unique number or other designation of the test subject

(9) The size of the ensemble and other ensemble elements assigned to the test subject

(10) The specific body measurements and clothing sizes of the test subject

(11) Photographs as specified in 8.2.2.4.4.5

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Nov 05 21:13:53 EST 2020

Committee Statement

Committee Statement: Greater documentation is needed to match the ensemble size with the individual test subjects performing the test.

Response Message: SR-81-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
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Kennedy, Jeffrey
Kerbow, Kyle
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Lakomiak, Paul S.
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Nystrom, Ulf
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Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 70-NFPA 1990-2020 [Section No. 8.2.3.1.1.2]

8.2.3.1.1.2

Specific requirements for this test method include the following:

(1) All areas of the manikin body covered by the specimen being tested shall be evaluated for liquidtight integrity.

(2) The configuration and placement of the glove and sleeve interface shall be the same on both arms.

(3) If outer gloves are worn in conjunction with gloves attached to the ensemble or if outer boots are worn in conjunction with garment socks to meet foot protection requirements, these elements shall not collect liquid.

(4) Where socks are used as part of an encapsulating ensemble, it shall be permitted that testing be performed on only one representative outer boot style for the evaluation of the ensemble.

(5) Specific requirements for testing garment elements, nonencapsulating ensembles, and encapsulating ensembles are shown in Table 8.2.3.1.1.2.

Table 8.2.3.1.1.2 Test Duration for Liquid Integrity Testing

Level	Applicability	Test Duration (min)	Duration in Each Orientation
Ultrahigh	NFPA 1991	60	15
High	NFPA 1992; NFPA 1994 Class 1, Class 2, and Class 2R	20	5
Moderate	NFPA 1994 Class 3 and Class 3R	8	2
Low	NFPA 1994 Class 4	4	1

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 03 11:51:36 EST 2020

Committee Statement

Committee Statement: Adding clarity to the requirement for evaluation of performance. Since this method includes testing of elements and non-encapsulating suits, all areas of the manikin may not have to be evaluated.

Response Message: SR-70-NFPA 1990-2020

Public Comment No. 67-NFPA 1990-2020 [Section No. 8.2.3.1.1.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 71-NFPA 1990-2020 [Section No. 8.2.3.1.7]

8.2.3.1.7 Interpretation.

8.2.3.1.7.1

Evidence of liquid on the liquid-absorptive garment~~,~~ inside the specimen~~,~~ or on the interior surface of the encapsulating or nonencapsulating ensemble as determined by visual, tactile, or absorbent toweling shall constitute failure of the specimen.

(A)

For NFPA 1992 garment elements, evidence of liquid on the liquid-absorptive garment shall constitute a failure. The presence of liquid inside the specimen garment or on the interior surface of the specimen garment extending greater than 2 in. (50 mm) from the leading edge of the coat bottom, coat sleeve ends, or pant leg ends shall constitute a failure.

8.2.3.1.7.2

For the glove and footwear parts of ~~the~~ ensembles that consist of multiple separate layers, accumulation of liquid between any layers shall constitute failure.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 03 11:54:01 EST 2020

Committee Statement

Committee Statement: Current language does not account for testing limitations when evaluating garment elements as allowed by NFPA 1992. When evaluating products to NFPA 1992, there are times when only a coat or a pant is tested. The liquid integrity test prohibits the acceptability of these products due to the splash that occurs during normal testing. Since the evaluation does not always include ensembles, the interior surfaces at the ends of the sleeves and pants and coat bottoms are susceptible to moisture due to this splashing. The test labs are unable to make a determination whether or not overlap between separate elements will deem the product acceptable, and therefore a minimal amount of 2 inches of splash up is being added to address this issue.

Response Message: SR-71-NFPA 1990-2020

Public Comment No. 68-NFPA 1990-2020 [Section No. 8.2.3.1.7]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

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Fithian, William A.

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Lakomiak, Paul S.

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Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 72-NFPA 1990-2020 [Section No. 8.2.3.3.4.3]

8.2.3.3.4.3

After flexing and observation of separation, the footwear specimen shall be marked with a water height line on the exterior at a height of 75 mm (3 in.) below the height of the boot as defined in ~~15.4.3~~ 6.1.5.4 but no lower than ~~200 mm (8 in.)~~ 125 mm (5 in.) where measured up from the center of the insole at the heel. The measurement shall be made on the interior and transferred to the exterior. Plain white paper toweling shall be placed inside the footwear specimen such that the paper toweling intimately contacts all areas inside the footwear specimen to at least the water height line. The footwear specimen shall then be placed in a container that allows its immersion in tap water~~,~~ that is treated with a dye and a surfactant that achieves a surface tension of 35 dynes/cm ± 5 dynes/cm, to the water height line.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 03 11:57:08 EST 2020

Committee Statement

Committee Statement: Aligning the water line height methodology in relation to the height of protection with all other standards in the project and fix an incorrect section reference.

Response Message: SR-72-NFPA 1990-2020

Public Comment No. 35-NFPA 1990-2020 [Section No. 8.2.3.3.4.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
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Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
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Monaco, Michael
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O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 45-NFPA 1990-2020 [New Section after 8.2.4.4.12]

8.2.4.4.13

The test subject shall be identified by a unique number or other designation.

8.2.4.4.14

The test subject's body measurements and clothing sizes shall be taken and shall include, but not be limited to, the subject's height, weight, neck circumference, chest circumference, waist circumference, sleeve length, inseam, glove size, shoe size, and facepiece size.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:09:43 EDT 2020

Committee Statement

Committee Statement: Additional details are included for specification in this test to better permit the use of quantitative measurements and the associated criteria. Other reporting details are undertaken to match test results with the ensemble size and test subject.

Response Message: SR-45-NFPA 1990-2020

Public Comment No. 330-NFPA 1990-2020 [Global Input]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

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Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 46-NFPA 1990-2020 [Sections 8.2.4.5.10, 8.2.4.5.11, 8.2.4.5.12, 8.2.4.5.13, 8....]

8.2.4.5.10

The test subject shall then be assisted in doffing the ensemble to prevent contact of the outside contaminated surface of the ensemble with the subject's skin or black indicator garments.

8.2.4.5.10.1

If accidental contact occurs, the specific location of contact shall be noted and the test shall be repeated or the specific affected area shall not be considered when interpreting whether or not the garment passes or fails.

8.2.4.5.11

After doffing, the ~~masked~~ control covered areas shall be ~~unmasked~~ uncovered on the black indicator garment and the test subject shall be examined under black light in the viewing area for evidence of particulate inward leakage.

8.2.4.5.12

Photographs shall be taken of the test subject under black light with the following minimum positions:

(1) Front, right, back, and left side of test subject's neck and head

(2) Front, right, back, and left side of test subject's upper torso

(3) Front, right, back, and left side of test subject's lower torso

8.2.4.5.12.1

The exposure of the test subject under black light should be bracketed in the f-stop settings of the camera to provide photographs with varying contrast to permit documentation of any observed fluorescence.

8.2.4.5.12.2

Specific areas of known fluorescence that are not attributed to other sources, e.g., lint, cross-contamination during doffing, or residual detergent on the black indicator garment or test subject's skin, shall be included as part of the report on a chart showing their specific location.

8.2.4.5.13

A separate black light shall be used to inspect any areas where the presence of fluorescent particles might be unclear. ~~*(See A.18.5.4.8.)*~~

8.2.4.5.14

~~The laboratory shall be permitted to further sample any areas that are suspect for particle contamination using the procedures established in 8.2.4.5.8 . These procedures, when used, shall be employed for documentation purposes only and shall not be used for interpreting compliance with the performance requirement.~~ Where fluorescence on the black indicator garment is observed or suspected, those specific areas shall be sampled for particle contamination using the procedures established in 8.2.4.6 .

Supplemental Information

File Name	Description	Approved
1990_SR_46_8.2.4.5.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Oct 19 11:13:32 EDT 2020

Committee Statement

Committee Statement: Additional details are included for specification in this test to better permit the use of quantitative measurements and the associated criteria. Other reporting details are undertaken to match test results with the ensemble size and test subject.

Response Message: SR-46-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

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Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 47-NFPA 1990-2020 [Section No. 8.2.4.6]

8.2.4.6 Sampling and Analysis of Black Indicator Garment.

8.2.4.6.1

The test subject's black indicator garment shall be sampled using the following procedures to recover any aerosol that has been deposited~~.~~ : ~~This skin-rinse sampling shall be performed by pressing a tube against the portion of the black indicator garment to be sampled and adding 20 mL (0.68 oz) of 0.01 N sodium hydroxide (NaOH). The solution shall be washed over the black indicator garment for approximately 10 seconds, then pipetted into a clean container.~~

(1) The number of areas sampled shall be limited to up to five areas that appear to show the greatest level of fluorescence when examined under the black light.

(2) At least one sample shall be taken from an area that shows no fluorescence during the examination under UV light and shall serve as a baseline for testing.

(3) ~~This skin~~ Garment rinse sampling shall be performed by pressing a tube of a suitable diameter against the portion of the black indicator garment to be sampled and adding 20 mL (0.68 oz) of 0.01 N sodium hydroxide (NaOH).

(4) The solution shall be washed over the black indicator garment for approximately 10 seconds, then pipetted into a clean container.

(5) All samples shall be labeled appropriately in the specific sampling location before they are analyzed.

(6) For each of the black indicator garment rinse samples, approximately 5 mL (0.17 oz) of each ~~of the samples~~ shall be analyzed in a fluorometer to determine the mass of the aerosol that is present in the sample.

(7) The results shall be recorded and verified to identify and eliminate any errors in reading or recording the data.

(8) Test results shall be reported in μg/cm^2 at each sampling location.

~~**8.2.4.6.2**~~

~~All samples shall be labeled appropriately before they are analyzed.~~

~~**8.2.4.6.3**~~

~~For each of the black indicator garment–rinse samples, approximately 5 mL (0.17 oz) of each of the samples shall be analyzed in a fluorometer to determine the mass of aerosol that is present in the sample. The results shall be recorded and verified to identify and eliminate any errors in reading or recording the data.~~

Supplemental Information

File Name	Description	Approved
1990_SR_47_8.2.4.6.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Oct 19 11:21:47 EDT 2020

Committee Statement

Committee Statement: Additional details are included for specification in this test to better permit the use of quantitative measurements and the associated criteria. Other reporting details are undertaken to match test results with the ensemble size and test subject.

Response Message: SR-47-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 48-NFPA 1990-2020 [Sections 8.2.4.8, 8.2.4.9]

8.2.4.8 Report.

8.2.4.8.1

Photographic records documenting the test ensemble and results shall ~~consist of~~ include the following:

(1) Photographs of the test subject in the full test ensemble immediately before entering the aerosol chamber, with additional photographs~~,~~ included as warranted~~,~~ of the test subject in the ensemble showing the design details

(2) Black light photographs of the test subject after doffing that cover all body locations, with the test subject~~s~~ wearing shorts and, for female test subjects, a sports bra

(3) Test conditions, including the following:

(a) Challenge aerosol mass concentration averaged for the duration of the test

(b) Average wind speed, temperature, and relative humidity for the test

(c) Date of test and test operator

(4) Specific observations ~~for~~ about the location of any ~~deposited~~ aerosol deposited on the test ~~subjects~~ subject

(5) Any notable observations by the test operators (especially system openings, mask breaches, or ~~poor fits~~ poorly fit ensemble elements)

(6) Any supplemental test data sampling and analysis of the black indicator garments ~~provided for documentation~~ that provide the level of fluorescent particles present

8.2.4.8.2

If post-exposure photographs show no aerosol deposits and show only a black garment in a dark room, the following statement shall be permitted to be used in lieu of post-exposure photographs: “No visible aerosol deposits were revealed in the photographs.”

8.2.4.8.3

The following additional information about the test ensembles and test subjects shall be reported:

(1) The unique number of other designation of the test subject

(2) The size of the ensemble and other ensemble elements assigned to the test subject

(3) The specific body measurements and clothing sizes for each test subject

8.2.4.9 Interpretation.

~~Any evidence of particulate inward leakage on any test subject’s skin or indicator garments as determined by visual inspection under a black light shall constitute failure.~~

8.2.4.9.1

The absence of any evidence of particulate inward leakage on any test subject’s indicator garments as determined by visual inspection under a black light shall constitute a passing performance.

8.2.4.9.2

Where the measurement of the surface concentrations of fluorescent particles is performed, the specific surface concentration at each location shall be reported and used to determine passing or failing performance.

Supplemental Information

File Name	Description	Approved
1990_SR_48_8.2.4.8.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Oct 19 11:23:38 EDT 2020

Committee Statement

Committee Statement: Additional details are included for specification in this test to better permit the use of quantitative measurements and the associated criteria. Other reporting details are undertaken to match test results with the ensemble size and test subject.

Response Message: SR-48-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey

Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 165-NFPA 1990-2020 [Sections 8.3.1.1.1.2, 8.3.1.1.1.3, 8.3.1.1.1.4, 8.3.1.1.1.5...]

8.3.1.1.1.2

Modifications to this test method for testing ~~suit~~ garment materials after flexing and abrading shall be as specified in ~~8.3.1.7~~ 8.3.1.1.7 .

8.3.1.1.1.3

Modifications to this test method for testing glove materials after abrading shall be as specified in ~~8.3.1.8~~ 8.3.1.1.8 .

8.3.1.1.1.4

Modifications to this test method for testing footwear materials after abrading shall be as specified in ~~8.3.1.9~~ 8.3.1.1.9 .

8.3.1.1.1.5

Modifications to this test method for testing seams shall be as specified in ~~8.3.1.10~~ 8.3.1.1.10 .

8.3.1.1.1.6

Modifications to this test method for testing primary materials against liquefied gases shall be as specified in ~~8.3.1.11~~ 8.3.1.1.11 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Wed Nov 11 08:11:47 EST 2020

Committee Statement

Committee Statement: Fixing referenced sections.
Response Message: SR-165-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 152-NFPA 1990-2020 [New Section after 8.3.1.1.8.3]

8.3.1.1.8.4

Where the glove chemical protection layer has a seam, straight seam specimens shall be permitted to be tested in lieu of material specimens. The seam specimens shall be tested after the conditioning specified in 8.1.4 . The test cell shall include both the chemical protection layer material and the chemical protection layer seam. The seam shall be located in the approximate center of the test cell.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 12:07:45 EST 2020

Committee Statement

Committee Statement: Glove seams are substantially smaller than other ensemble element seams. Seams of this size are easily able to be placed into a test cell such that enough of the material and seam can be evaluated at the same time. NFPA 1971 also includes language to allow this sampling procedure for Liquid Penetration and Viral Penetration.

Response Message: SR-152-NFPA 1990-2020

Public Comment No. 64-NFPA 1990-2020 [Section No. 8.3.1.1.8]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 153-NFPA 1990-2020 [Section No. 8.3.1.1.10]

8.3.1.1.10 Specific Requirements for Testing Seams.

8.3.1.1.10.1

Samples for conditioning shall be 600 mm (23 $^{9}/_{16}$ in.) lengths of prepared straight seams or seams cut from the ensemble.

8.3.1.1.10.2

Seam specimens shall be prepared from straight seam samples that have a minimum of ~~150 mm (6 in.)~~ 75 mm (3 in.) of material on each side of the seam center.

8.3.1.1.10.3

~~Permeation test~~ Seam specimens shall be cut such that the exact seam center divides the specimen in half.

8.3.1.1.10.4

Seam specimens shall be prepared such that they represent each different ~~seam or shall be taken from each different type of seam found in the vapor-protective suit, including as a minimum the suit-to-suit material seams and the suit-to-visor material seams.~~ stitch and sealing method. Specimens shall be permitted to be taken from the finished product.

8.3.1.1.10.5

Garment seams shall include, at a minimum, the ~~suit~~ garment -to-~~suit~~ garment material seams and the ~~suit~~ garment -to-visor material seams.

~~**8.3.1.1.10.6**~~

~~Samples for conditioning shall be 600 mm (23 $^{9}/_{16}$ in.) lengths of prepared seams or seams cut from vapor-protective ensembles.~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 12:12:46 EST 2020

Committee Statement

Committee Statement: Adding clarification to the types of seams that should be used when performing this test. In order to limit the false failures due to the limitations of the test method, straight seams offer the most consistent approach and can allow the labs to adequately evaluate the performance of the seam in a repeatable and reproducible manner.

Also made several editorial revisions for clarity and flow.

Response Message: SR-153-NFPA 1990-2020

Public Comment No. 41-NFPA 1990-2020 [Section No. 8.3.1.1.10]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters

5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

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Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 65-NFPA 1990-2020 [New Section after 8.3.1.2]

8.3.1.3 Low Vapor Chemical Permeation Test.

8.3.1.3.1 Application.

8.3.1.3.1.1

The test shall apply to NFPA 1994-certified Class 1 garments, gloves, footwear uppers, socks, hoods, and elastomeric interface materials and seams in the elements and between components.

8.3.1.3.1.2

Specific requirements for testing garment, hood, and sock materials shall be as specified in 8.3.1.3.8 .

8.3.1.3.1.3

Specific requirements for testing visors shall be as specified in 8.3.1.3.9 .

8.3.1.3.1.4

Specific requirements for testing glove materials shall be as specified in 8.3.1.3.10 .

8.3.1.3.1.5

Specific requirements for testing footwear materials shall be as specified in 8.3.1.3.11 .

8.3.1.3.1.6

Specific requirements for testing seams shall be as specified in 8.3.1.3.12 .

8.3.1.3.1.7

Specific requirements for testing elastomeric interface materials shall be as specified in 8.3.1.3.13 .

8.3.1.3.2 Samples.

Samples shall be either NFPA 1991- or NFPA 1994-certified ensembles, garment materials, visor materials, gloves, socks, or footwear of the sizes specified in the modifications.

8.3.1.3.2.1

Samples for conditioning shall be as specified according to the specific requirements in 8.1.1 , as appropriate.

8.3.1.3.2.2

All layers of the samples during conditioning shall be present and configured in the order and orientation in which they are meant to be worn.

8.3.1.3.2.3

Samples shall be cut to the specimen size.

8.3.1.3.3 Specimens.

8.3.1.3.3.1

Specimens shall be sized as specified in Test Operations Procedure (TOP) 08-2-503, *Low Volatility Agent Permeation (LVAP) Swatch Testing* .

8.3.1.3.3.2

A minimum of three specimens shall be tested.

8.3.1.3.4 Apparatus.

8.3.1.3.4.1

The test apparatus and related equipment specified in TOP 08-2-503 shall be used.

8.3.1.3.4.2

Facilities engaged in this testing shall meet the following requirements:

(1) The facility shall have capabilities including the following:

   (a) Storage of hazardous chemicals

   (b) General and specialized chemical analysis specific to the chemicals being tested

   (c) Emergency response preparedness for accidents involving the chemicals

   (d) Hazardous waste storage and disposal

(2) The facility shall have a low volatility agent permeation (LVAP) swatch test fixture and a control/data system with the required test cells that provides the required test conditions and the ability to control the temperature from 10°C (50°F) above ambient to 50°C (± 2°C) [122°F (± 4°F)], as well as to record the test conditions every minute.

(3) The facility shall have a preconditioning chamber that can operate for 24 hours at the specified conditions of 32.2 ± 0.7°C (90 ± 2°F) and 80 ± 5 percent relative humidity (RH). The conditions shall be measured and recorded using calibrated temperature and RH probes.

8.3.1.3.4.3

The test equipment shall include the following:

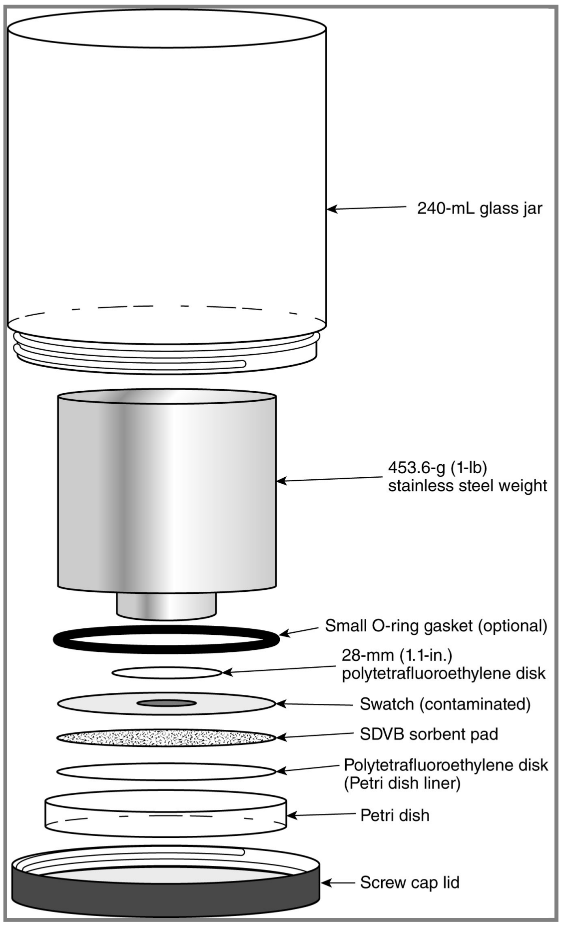
(1) A polycarbonate Petri dish, a 47 mm (1.85 in.) polytetrafluoroethylene (PTFE) swatch, a sorbent pad, a swatch, a 28 mm (1.1 in.) PTFE disk, and a cylindrical stainless steel weight contained within an inverted, 240 mL (8.1 oz) glass jar, as shown in Figure 8.3.1.3.4.3 .

(2) A cylindrical weight shall be individually numbered 316 stainless steel cylinders, each with a mass of 454.0 g (± 1 g) [92 tsp (± 0 tsp)] and a contact diameter of 28.7 mm, where the mass and diameter are capable of delivering 1 psi of pressure to a 6 cm^2 region.

(3) A sorbent material suitable for the test chemical that has a minimum detection mass capability of 6.0 $\mu g/cm^2$.

(4) A latex swatch to be used as the standard reference material that consists of 10 mil, medium-soft (40A durometer), natural latex rolled sheets with a thickness tolerance of ± 0.05 mm (± 0.002 in.).

Figure 8.3.1.3.4.3 Diagram of Test Apparatus for Low Vapor Pressure Permeation Testing.



8.3.1.3.5 Procedure.

8.3.1.3.5.1

Specimens shall be tested as specified in TOP 08-2-503 against Sulfuric acid, 93.1 percent w/w (aqueous) with the following modifications:

(1) Extraction and analytical techniques shall be utilized to achieve a minimum detection limit of 6.0 μg/cm^2 .

(2) The specific extraction efficiency and update rate for the selected sorbent, extraction, and analytical techniques shall be reported.

(3) The contact period shall be limited to 1 hour.

(4) The selected sorbent, extraction, and analytical techniques shall be applied in the analysis of the exposed test specimens and controls.

8.3.1.3.6

The following information shall be reported for each test:

(1) The identification of the test sample and the location where specimens were taken.

(2) The individual specimen weight and average weight of all specimens in g/m^2 .

(3) The individual specimen thickness and average thickness of all specimens in mm.

(4) The identification of the conditioning chamber used, test chamber used, and laboratory used.

(5) A description of specimen preconditioning and pretreatments, if any.

(6) The identification of the challenge test chemical.

(7) The challenge test chemical and its purity or concentration.

(8) The challenge drop volume and pattern applied.

(9) Results for the negative and positive controls.

(10) The mass of the chemical collected in μg for each specimen.

(11) The calculated individual and average cumulative permeation for each specimen in μg/cm^2 .

(12) The test duration.

(13) The test temperature and RH for all the environmental control fixtures during preconditioning and test execution.

8.3.1.3.7 Interpretation.

The average cumulative permeation shall be used to determine pass or fail performance.

8.3.1.3.8 Specific Requirements for Testing Garment Materials After Flexing and Abrading.

8.3.1.3.8.1

Samples for conditioning shall be 200 mm × 280 mm (8 in. × 11 in.) rectangles and shall consist of all the layers as configured in the testing garment.

8.3.1.3.8.2

Two samples shall be conditioned by flexing as specified in 8.1.3 .

(A)

One sample shall be flexed with the longitudinal axis parallel to the machine direction of the material, and the second sample shall be flexed with the longitudinal axis parallel to the cross-machine direction of the material.

(B)

After flexing, two samples for abrasion conditioning, each measuring 45 mm × 230 mm (1 ³⁄₄ in. × 9 in.), shall be cut from the center of the flexed samples.

(C)

At least one specimen for abrasion conditioning shall be taken from a sample flexed in the machine direction, and at least one specimen for abrasion conditioning shall be taken from a sample flexed in the cross-machine direction for each chemical tested.

8.3.1.3.8.3

These new samples shall be conditioned by abrading as specified in 8.1.4 .

(A)

Following abrasion, only one specimen for permeation resistance testing shall be taken from each sample.

(B)

The permeation test specimen shall be taken from the exact center of the abraded sample so that the center of the permeation test and the center of the abraded sample coincide.

8.3.1.3.9 Specific Requirements for Testing Visors.

8.3.1.3.9.1

Samples for conditioning shall be visor materials.

8.3.1.3.10 Specific Requirements for Testing Glove Materials After Abrading.

8.3.1.3.10.1

Samples for conditioning shall be whole glove components or whole glove individual elements.

8.3.1.3.10.2

Three samples for abrasion conditioning, each measuring 45 mm × 230 mm (1 3⁄4 in. × 9 in.), shall be cut from the center of the gauntlet portion of the sample.

8.3.1.3.10.3

These new samples shall be conditioned by abrading as specified in 8.1.4 .

(A)

After abrasion, only one specimen for permeation resistance testing shall be taken from each sample.

(B)

The permeation test specimen shall be taken from the exact center of the abraded sample so that the center of the permeation test and the center of the abraded sample coincide.

8.3.1.3.11 Specific Requirements for Testing Footwear.

8.3.1.3.11.1

This test shall apply to all types of footwear configurations.

8.3.1.3.11.2

Where the footwear incorporates a sock or over boot constructed of garment material, the garment material flex fatigue resistance test, as specified in 8.1.3 , shall be permitted to be substituted for this test.

8.3.1.3.11.3

Footwear upper samples for conditioning shall be whole footwear items.

8.3.1.3.11.4

Footwear upper samples shall be conditioned by abrading as specified in 8.1.4 .

8.3.1.3.11.5

After abrasion, only one test specimen for chemical permeation resistance testing shall be taken from each sample.

8.3.1.3.11.6

The chemical permeation test specimen shall be taken from the exact center of the abraded sample so that the center of the permeation test specimen and the center of the abraded specimen coincide.

8.3.1.3.12 Specific Requirements for Testing Seams of Garments, Hoods, Socks, Visors, and Gloves.

8.3.1.3.12.1

Samples for conditioning shall be 600 mm (23 ½ in.) lengths of prepared seam or shall be cut from ensembles.

8.3.1.3.12.2

Seam specimens shall be prepared from seam samples that have a minimum of 75 mm (3 in.) of material on each side of the seam center.

8.3.1.3.12.3

Permeation test specimens shall be cut such that the exact seam center divides the specimen in half.

8.3.1.3.12.4

Seam specimens shall represent each type of seam found in the garment or shall be taken from each type of seam found in the garment, including, at a minimum, the garment-to-garment material seams and the garment-to-visor material seams.

8.3.1.3.12.5

Seam specimens shall be taken from the gauntlet portion of the glove where an external seam is used in the construction of the glove.

8.3.1.3.13 Specific Requirements for Testing Elastomeric Interface Materials.

8.3.1.3.13.1

Samples shall not be subjected to conditioning by flexing or abrasion.

8.3.1.3.13.2

Specimens shall be taken from elastomeric interface sheet material or formed elastomeric interface items that are representative of the elastomeric interface material nominal thickness.

Supplemental Information

File Name	Description	Approved
1990_SR_65_low_vapor_v2_NFPA_1990_Second_Revision_Resolution_LVAP_Test.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 11:33:47 EDT 2020

Committee Statement

Committee Statement: A test method was prepared during the First Draft meeting but did not get into the First Draft although the performance requirement appeared in Chapter 7. The proposed test method is based on an already validated test procedure that has been applied by at least one certification laboratory and other laboratories for a range of chemicals. The test method is to be applied for the evaluation of NFPA 1994 Class 1 permeation resistance against sulfuric acid that cannot be evaluated using Chemical Permeation Resistance Test Two.

Response Message: SR-65-NFPA 1990-2020

Public Comment No. 233-NFPA 1990-2020 [Section No. 7.1.2.4]

Public Comment No. 301-NFPA 1990-2020 [Section No. 7.1.2.4]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
0 Affirmative with Comments
1 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Negative with Comment

Fithian, William A.

The following edits are needed: Sections 8.3.1.3.10 and 8.3.2.9.11 do not include the ability to test glove seams in lieu of glove materials as permitted in other sections within 8.3.1. and needs to be changed for consistency.; and Section 8.3.1.3.12 and 8.3.2.11.2 do not specify testing straight seams as in other sections of 8.3.1 and needs to be changed for consistency.

Second Revision No. 137-NFPA 1990-2020 [Section No. 8.3.1.2.1.6]

8.3.1.2.1.6

Specific requirements for testing footwear materials shall be as specified in ~~8.3.1.2.20~~ 8.3.1.2.22 .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 09:39:20 EST 2020

Committee Statement

Committee Statement: Correcting reference.
Response Message: SR-137-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 154-NFPA 1990-2020 [New Section after 8.3.1.2.21.3]

8.3.1.2.21.4

Where the glove chemical protection layer contains a seam, straight seam specimens shall be permitted to be tested in lieu of material specimens. The seam specimens shall be tested after the conditioning specified in 8.1.4 . The test cell shall include both the chemical protection layer material and the chemical protection layer seam. The seam shall be located in the approximate center of the test cell.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:15:54 EST 2020

Committee Statement

Committee Statement: Glove seams are substantially smaller than other ensemble element seams. Seams of this size are easily able to be placed into a test cell such that enough of the material and seam can be evaluated at the same time. NFPA 1971 also includes language to allow this sampling procedure for Liquid Penetration and Viral Penetration.

Response Message: SR-154-NFPA 1990-2020

Public Comment No. 65-NFPA 1990-2020 [Section No. 8.3.1.2.21]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory

Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 155-NFPA 1990-2020 [Section No. 8.3.1.2.23]

8.3.1.2.23 Specific Requirements for Testing Seams of Garments, Hoods, Socks, Visors, and Gloves.

8.3.1.2.23.1

Samples for conditioning shall be 600 mm (23 ½ in.) lengths of prepared straight seam or cut from ensembles.

8.3.1.2.23.2

Seam specimens shall be prepared from straight seam samples that have a minimum of 75 mm (3 in.) of material on each side of the seam center.

8.3.1.2.23.3

~~Permeation test~~ Seam specimens shall be cut such that the exact seam center divides the specimen in half.

8.3.1.2.23.4

Seam specimens shall be prepared such that they represent each ~~type of seam found in the garment or shall be taken from each type of seam found in the garment, including as a minimum the garment-to-garment material seams and the garment-to-visor material seams.~~ stitch and sealing method. Specimens shall be permitted to be taken from the finished product.

8.3.1.2.23.5

Garment seams shall include, at a minimum, ~~the~~ garment-to-garment material seams and ~~the~~ garment-to-visor material seams, when applicable.

8.3.1.2.23.6

Seam specimens shall be taken from the gauntlet portion of ~~the~~ a glove where an external seam is used in the construction of the glove.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:17:57 EST 2020

Committee Statement

Committee Statement: Adding clarification to the types of seams that should be used when performing this test. In order to limit the false failures due to the limitations of the test method, straight seams offer the most consistent approach and can allow the labs to adequately evaluate the performance of the seam in a repeatable and reproducible manner.

Response Message: SR-155-NFPA 1990-2020

Public Comment No. 42-NFPA 1990-2020 [Section No. 8.3.1.2.23]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters

5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 156-NFPA 1990-2020 [Section No. 8.3.4.5]

8.3.4.5 Report.

8.3.4.5.1

The pass or fail result for each specimen shall be recorded and reported.

8.3.4.5.2

The assay titer in PFU/mL of Phi-X174 shall be recorded and report.

8.3.4.6 Interpretation.

Specimens shall exhibit no more than 10 PFU/mL of Phi-X174 in the assay titer to pass the test.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:19:57 EST 2020

Committee Statement

Committee Statement: This test is highly sensitive to false failures. A few of the reasons include: 1. Inadequacy of the test cell to properly seal and prevent possible wicking of the contaminant on certain materials 2. The multiple transfers required to prepare, expose and analyze samples and results 3. The inability to detect whether or not cross contamination or residual contaminants exist throughout the entire testing process Through historical data, when PFU counts have no more than 10, the resolution to that failure is typically a simple retest with no modification to the product. This leads the labs and manufacturers to multiple rounds of expensive testing due to a false failure that is inherent to the test method. When actual failure occurs, the PFU counts are substantially higher and generally too numerous to count. For perspective, the test consists of exposing specimens to over a million PFUs. Having <=10 show up at the end of the test is considered to be contamination and not an indication of material performance or safety.

Adding a requirement to include the assay titer results in the test report.

Response Message: SR-156-NFPA 1990-2020

Public Comment No. 38-NFPA 1990-2020 [Section No. 8.3.4.5]

Public Comment No. 39-NFPA 1990-2020 [New Section after 8.3.4.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 157-NFPA 1990-2020 [Section No. 8.3.4.8]

8.3.4.9 Specific Requirements for Testing Glove Materials.

8.3.4.9.1

Samples for conditioning shall be whole gloves.

8.3.4.9.2

Where the glove chemical protection layer contains a seam, seam specimens shall be permitted to be tested in lieu of material specimens. The test cell shall include both the chemical protection layer material and the chemical protection layer seam. The seam shall be located in the approximate center of the test cell.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 12:23:24 EST 2020

Committee Statement

Committee Statement: Glove seams are substantially smaller than other ensemble element seams. Seams of this size are easily able to be placed into a test cell such that enough of the material and seam can be evaluated at the same time. NFPA 1971 also includes language to allow this sampling procedure for Liquid Penetration and Viral Penetration.

Response Message: SR-157-NFPA 1990-2020

Public Comment No. 66-NFPA 1990-2020 [Section No. 8.3.4.8]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 158-NFPA 1990-2020 [Section No. 8.3.4.10]

8.3.4.11 Specific Requirements for Testing Garment or Glove Seams.

8.3.4.11.1

Samples for conditioning shall be 600 mm (23½ in.) lengths of prepared ~~seam or~~ straight seams or straight seams cut from ensembles.

8.3.4.11.2

Seam specimens shall be prepared from seam samples that have a minimum of 75 mm (3 in.) of material on each side of the seam center. ~~Permeation test~~ Viral penetration test specimens shall be cut such that the exact seam center divides the specimen in half.

8.3.4.11.3

Seam specimens shall be prepared such that they represent each ~~different~~ type of ~~seam found~~ stitch and sealing method found in the garment or glove. Seam specimens shall be ~~taken from each type of seam found in the garment, including as a minimum the garment-to-garment material seams and the garment-to-visor material seams.~~ permitted to be taken directly from the garment or glove.

8.3.4.11.4

The garment seams shall include, at a minimum, the garment-to-garment material ~~seams~~ seam and the garment-to-visor material ~~seams~~ seam.

8.3.4.11.5

~~Seam specimens from gloves~~ The glove seams shall be taken from the gauntlet portion of ~~the~~ a glove when an external seam is used in the construction of the glove.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:25:20 EST 2020

Committee Statement

Committee Statement: Adding clarification to the types of seams that should be used when performing this test. In order to limit the false failures due to the limitations of the test method, straight seams offer the most consistent approach and can allow the labs to adequately evaluate the performance of the seam in a repeatable and reproducible manner.

Response Message: SR-158-NFPA 1990-2020

Public Comment No. 40-NFPA 1990-2020 [Section No. 8.3.4.10]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments

0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 159-NFPA 1990-2020 [Section No. 8.3.5]

8.3.5 Liquid Repellency Test.

8.3.5.1 Application.

8.3.5.1.1

This test shall apply to garment~~, glove, footwear upper, hood, and elastomeric interface~~ and hood materials.

8.3.5.1.2

If the garment~~, glove, footwear,~~ or hood element is constructed of several layers, then all the layers, arranged in the correct order, shall be tested together.

8.3.5.2 Sample Preparation.

8.3.5.2.1

Samples shall be at least 1 m (1 yd) squares of material for garments and hoods. ~~, and a sufficient amount of individual items for gloves, footwear upper, and elastomeric interface materials to provide the required number of specimens.~~

8.3.5.2.2

Samples shall be conditioned as specified in ~~8.1.2~~ 8.1.10 .

8.3.5.3 Specimens.

8.3.5.3.1

Specimens shall be ~~the~~ sized as specified in ISO 6530, *Protective clothing — Protection against liquid chemicals — Test method for resistance of materials to penetration by liquids*.

8.3.5.3.2

A minimum of six specimens shall be tested.

8.3.5.4 Apparatus.

The test apparatus and related equipment specified in ISO 6530~~, *Protective clothing — Protection against liquid chemicals — Test method for resistance of materials to penetration by liquids,*~~ shall be used.

8.3.5.5 Procedure.

Specimens shall be tested as specified in ISO 6530~~, *Protective clothing — Protection against liquid chemicals — Test method for resistance of materials to penetration by liquids,*~~ against the following chemicals:

(1) Sulfuric acid, 30 percent, w/w (aqueous)

(2) Sodium hydroxide, 10 percent, w/w (aqueous)

(3) 1-Butanol, >95 percent, w/w (undiluted)

(4) o-Xylene, >95 percent, w/w (undiluted)

8.3.5.6 Report.

Both the index of penetration and the index of repellency shall be reported for each specimen, ~~and~~ as well as the ~~average~~ index averages for each sample.

8.3.5.7 Interpretation.

The average index of repellency shall be used to determine pass or fail performance.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 12:28:20 EST 2020

Committee Statement

Committee Statement: The committee decided to not include absorbency as a measurement for the current edition. However, other changes were made to address the application of the test to only garment and hood materials and to modify the conditioning to after laundering.

Response Message: SR-159-NFPA 1990-2020

Public Comment No. 285-NFPA 1990-2020 [Section No. 8.3.5.2.2]

Public Comment No. 284-NFPA 1990-2020 [Section No. 8.3.5]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Geiger, Troy A.

The technical committee should consider a flammability test after liquid repellency test is run with a hydrocarbon, such as O-xylene, which is already specified in the test.

Second Revision No. 79-NFPA 1990-2020 [Sections 8.4.3, 8.4.4, 8.4.5]

~~**8.4.3** Overall Ensemble Flash Test.~~

~~**8.4.3.1** Application.~~

~~This test method shall apply to complete ensembles.~~

~~**8.4.3.1.1**~~

~~Specific requirements for evaluating incomplete ensembles shall be as specified in 8.4.3.9 .~~

~~**8.4.3.1.2**~~

~~Specific requirements for evaluating NFPA 1994 -compliant Class 2R, Class 3R, and Class 4R ensembles shall be as specified in 8.4.3.10 .~~

~~**8.4.3.2** Samples.~~

~~**8.4.3.2.1**~~

~~Samples shall be complete protective ensembles, including garments, gloves, footwear, and, where applicable, respirators.~~

~~**8.4.3.2.2**~~

~~Samples shall be conditioned as specified in 8.1.2 .~~

~~**8.4.3.3** Specimens.~~

~~**8.4.3.3.1**~~

~~Specimens shall be complete protective ensembles, including garments, gloves, footwear, and, where applicable, respirators.~~

~~**8.4.3.3.2**~~

~~At least three specimens shall be tested.~~

~~**8.4.3.3.3**~~

~~Additional protective clothing components and equipment that are necessary to provide flash protection to the wearer shall be tested in conjunction with the liquid-splash protective clothing or ensemble.~~

~~**8.4.3.3.4**~~

~~Where socks are used as part of the protective ensemble, it shall be permitted that testing be performed on only one representative outer boot style for the evaluation of the ensemble.~~

~~**8.4.3.4** Apparatus.~~

~~**8.4.3.4.1**~~

~~A human form manikin shall be used to support the protective suit during chemical flash fire testing.~~

~~**8.4.3.4.2**~~

~~The manikin shall be coated with a suitable flame-retardant coating.~~

~~**8.4.3.4.3**~~

~~A one-piece flame-resistant coverall shall be placed over the manikin.~~

~~**8.4.3.4.4**~~

~~The protective ensemble to be tested shall be placed on the manikin, over the flame-resistant clothing, in accordance with the manufacturer's instructions.~~

~~**8.4.3.4.5**~~

~~A flash chamber shall be constructed as illustrated in Figure 8.4.3.4.5 and shall include the following:~~

~~The chamber shall have an internal width and depth of 2 m ± 100 mm (6 ½ ft ± 4 in.) and a height of 5 m ± 100 (16 ⅖ ft ± 4 in.).~~

~~The chamber shall be constructed of 50 mm × 100 mm (2 in. × 4 in.) framing lumber or other suitable structural material. A 20 mm (¾ in.) thick fire wall or other suitable flame-resistant paneling shall be used on the chamber walls. A piece of 13 mm (½ in.) heat-tempered safety glass shall be used on the opposite chamber walls of a size sufficient for multiple viewing points during testing.~~

~~The chamber shall be sealed with a suitable flame-resistant material to provide a gastight seal when the door is closed.~~

~~The chamber shall have a port for filling the chamber with propane gas located as shown in Figure 8.4.3.4.5 . The port shall allow isolation of the propane source through a valve and be leak-free with respect to the outside environment.~~

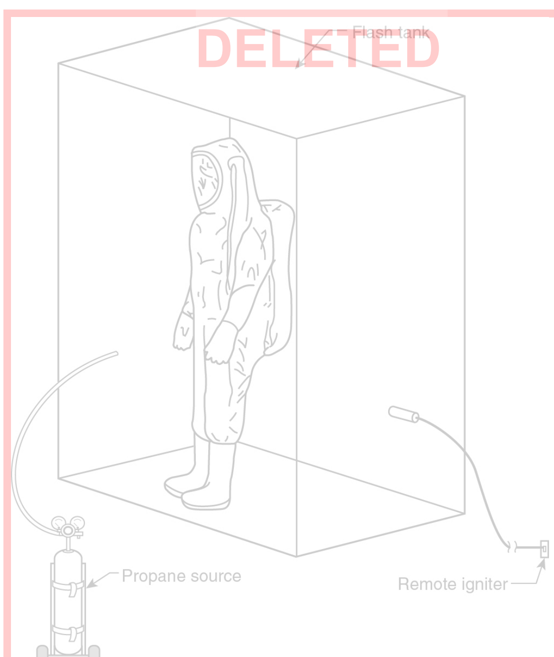
~~The chamber shall have a minimum of two ports for electric igniters located on one wall of the chamber positioned at heights on the wall such that the propane will ignite immediately once triggered. The ports shall be leak-free with respect to the outside environment.~~

~~The chamber shall have a top that allows containment of propane gas within the chamber during filling and venting of flash pressure after ignition.~~

~~A suitable stand shall be constructed that allows the manikin to be positioned 305 mm ± 25 mm (12 in. ± 1 in.) above the chamber floor.~~

~~The flash fire chamber shall be located so that testing is performed at a temperature of 24°C ± 11°C (75°F ± 20°F) and a relative humidity of 70 percent ± 25 percent. Tests shall not be conducted outdoors during precipitation.~~

~~**Figure 8.4.3.4.5 Overall Ensemble Chemical Flash Chamber.**~~



~~**8.4.3.5** Verification of Flash Exposure.~~

~~**8.4.3.5.1**~~

~~Prior to testing each day, thermocouples shall be placed in the empty chamber so that temperature measurements are taken at the following heights ± 2.5 cm (± 1 in.) from the floor: 30 cm (12 in.), 7.6 cm (30 in.), 122 cm (48 in.), 168 cm (66 in.), and 213 cm (84 in.).~~

~~**8.4.3.5.2**~~

~~A data acquisition system shall be used to collect the temperature readings during the burn exposure and shall be sufficient to provide at least one temperature reading per second for each thermocouple used.~~

~~**8.4.3.5.3**~~

~~Propane gas, at 99 percent purity or better, shall be metered into the chamber at a delivery pressure of 172.3 kPa ± 13.8 kPa (25 psi ± 2 psi) and rate of 0.16 m^3 /min ± 0.01 m^3 /min (5 1⁄2 ft^3 /min ± 1⁄2 ft^3 /min) for 2 minutes ± 1 minute to produce a visible chemical flash fire lasting 7 seconds ± 1 second. The exact time that it takes to produce a visible chemical flash fire lasting 7 seconds ± 1 second shall be recorded. The concentration of the propane shall be permitted to be checked by a combustible gas meter or similar detector.~~

~~**8.4.3.5.4**~~

~~After determining the time required to create a 7-second ± 1 second flash fire exposure, the data collected from the thermocouples shall be evaluated to determine the maximum temperatures reached during the exposure at each height location. The maximum average temperature of all locations shall be within a temperature range of 650°C to 1150°C (1202°F to 2102°F).~~

~~**8.4.3.6** Procedure.~~

~~**8.4.3.6.1**~~

~~The suited manikin shall be placed on the stand in the center of the flash chamber in an upright stationary position.~~

~~**8.4.3.6.2**~~

~~Propane gas at 99 percent purity or better shall be metered into the chamber at a delivery pressure of 172.3 kPa ± 13.8 kPa (25 psi ± 2 psi) and rate of 0.16 m^3 /min ± 0.01 m^3 /min (5.5 ft^3 /min ± 0.5 ft^3 /min).~~

~~**8.4.3.6.2.1**~~

~~The concentration of propane within the chamber shall be sufficient to produce a visible chemical flash fire lasting 7 seconds ± 1 second.~~

~~**8.4.3.6.2.2**~~

~~The concentration of the propane shall be permitted to be checked by a combustible gas meter or similar detector.~~

~~**8.4.3.6.3**~~

~~The flash chamber shall be viewed at both vantage points, front and back, throughout the test. Video documentation shall also be conducted from the front vantage point.~~

~~**8.4.3.6.4**~~

~~The chamber atmosphere shall be remotely ignited 30 seconds ± 5 seconds after the chamber has been filled with propane gas.~~

~~**8.4.3.6.5**~~

~~The suited manikin shall not be removed until all surfaces have cooled to ambient temperature.~~

~~**8.4.3.6.6**~~

~~The protective clothing or ensemble shall be removed from the manikin and examined visually for signs of physical damage from thermal exposure.~~

~~**8.4.3.6.7**~~

~~For NFPA 1991 -compliant ensembles, a gastight integrity test shall be performed on the ensemble in accordance with 8.2.1 following the chemical flash fire exposure.~~

~~**8.4.3.6.8**~~

~~For NFPA 1992 – and NFPA 1994 -compliant ensembles, a liquidtight integrity test shall be performed on the protective clothing or ensemble in accordance with 8.2.3.1 after the chemical flash fire exposure.~~

~~8.4.3.6.8.1~~

~~Testing for NFPA 1992 – and NFPA 1994 -compliant Class 1, Class 2, and Class 2R ensembles shall be performed with the suited manikin exposed to the liquid spray for a total of 4 minutes ± 1 minute in each of the four manikin orientations.~~

~~8.4.3.6.8.2~~

~~Testing for Class 3 and Class 3R ensembles shall be performed with the suited manikin exposed to the liquid spray for a total of 1 minute ± 15 seconds in each of the four manikin orientations.~~

~~8.4.3.6.8.3~~

~~Liquidtight integrity testing shall not be performed on Class 4 or Class 4R ensembles.~~

~~8.4.3.6.9~~

~~If the suit contains a visor, then the suit shall be donned by a test subject and evaluated as follows after either the gastight integrity or liquidtight integrity testing:~~

~~The test subject shall have a minimum visual acuity of 20/20 in each eye, uncorrected or corrected with contact lenses, as determined in a visual acuity test or doctor's examination.~~

~~Visual acuity testing within the suit shall be conducted using a standard 6.1 m (20 ft) eye chart with a normal lighting range of 100 to 150 foot-candles at the chart and with the test subject positioned at a distance of 6.1 m (20 ft) from the chart.~~

~~The test subject shall then read the standard eye chart through the lens of the SCBA facepiece and suit visor to determine his or her visual acuity.~~

~~8.4.3.7~~ ~~Report.~~

~~8.4.3.7.1~~

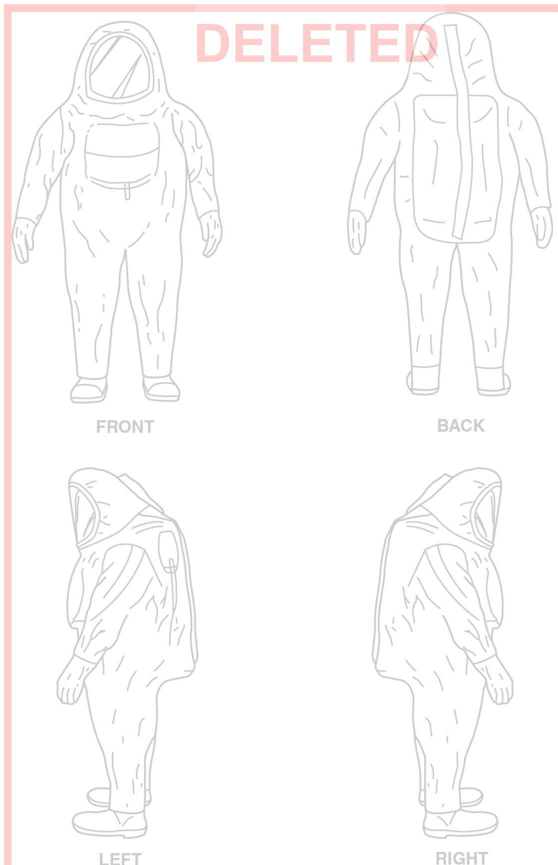
~~The postflash exposure liquidtight integrity test result, afterflame time, and visor clarity shall be reported and recorded for each test specimen.~~

~~**8.4.3.7.2**~~

~~An illustration of the protective clothing or ensemble as shown in Figure 8.4.3.7.2 shall be prepared, and the location of any damage shall be recorded on the illustration and reported. Separate illustrations shall be prepared for overcovers if tested with the protective suit. The damage to be reported shall include, but not be limited to, the following:~~

- ~~Charring~~
- ~~Blistering~~
- ~~Evidence of material melting~~
- ~~Delamination~~
- ~~Destruction of any suit components~~

~~**Figure 8.4.3.7.2 Suit Diagram (for noting damage locations).**~~



~~**8.4.3.7.3**~~

~~The verification burn visible chemical flash fire time shall be recorded and reported.~~

~~**8.4.3.7.4**~~

~~The verification burn maximum average temperature of all locations shall be recorded and reported.~~

~~**8.4.3.8** Interpretation.~~

~~**8.4.3.8.1**~~

~~Any specimen with an afterflame time greater than 2 seconds shall constitute failing performance.~~

~~**8.4.3.8.2**~~

~~For NFPA 1991 -compliant ensembles, the lowest ending inflation test pressure shall be used to determine compliance to the postflash fire simulation inflation test requirements.~~

~~**8.4.3.8.3**~~

~~For NFPA 1992 – and NFPA 1994 -compliant ensembles, liquid found on the inner liquid-absorptive garment following liquidtight integrity testing shall constitute failing performance.~~

~~**8.4.3.8.4**~~

~~The visual acuity of the test subject inside the suit shall be used for determining pass or fail performance.~~

~~**8.4.3.9** Specific Requirements for Testing Garments, Hoods, Gloves, and Footwear.~~

~~Where garments, hoods, gloves, and footwear that do not cover the entire manikin are tested, items of clothing constructed of flame-resistant materials shall be used to cover those exposed portions of the manikin body in a manner that does not cover the item being evaluated.~~

~~**8.4.3.10** Specific Requirements for Testing Class 2R, Class 3R, and Class 4R Ensembles.~~

~~Samples for Class Type R shall be conditioned as specified in 8.1.9 .~~

8.4.3 ~~Thermal Manikin Test 1~~ Overall Ensemble Flash Test .

8.4.3.1 Application.

8.4.3.1.1

This test method shall be applied to protective ensembles.

8.4.3.1.1.1

Specific requirements for evaluating incomplete ensembles shall be as specified in 8.4.3.7 .

8.4.3.1.1.2

Specific requirements for evaluating NFPA 1994-certified Class 2R, Class 3R, and Class 4R ensembles shall be as specified in 8.4.3.8 .

8.4.3.1.1.3

The specific requirement for evaluating ensembles or garments where this testing is also performed for the purposes of providing data on the percentage of a predicted burn injury shall be as specified in 8.4.3.9 .

8.4.3.2 Sample Preparation.

8.4.3.2.1

Samples for conditioning shall be complete protective ensembles that include respirator facepieces representing at least one ensemble configuration ~~in~~ for which the ensemble is certified.

8.4.3.2.1.1

For the certification of ensembles with SCBA, the test samples shall include only the respirator facepiece~~s~~ ~~but~~ and exclude the backframe~~s~~ , ~~harnesses~~ harness , air tank~~s~~ , pneumatics, and other SCBA components.

8.4.3.2.1.2

For the certification of ensembles using tight-fitting, facepiece ~~PAPR~~ powered air-purifying respirators (PAPR) , the test samples shall include the respirator facepiece~~s,~~ but exclude the blower~~s~~ , battery pack~~s~~ , belt~~s~~ , breathing hose~~s~~ , and canister~~s~~ or cartridges. A filter adaptor or other means shall be used to close off the blower connector~~s~~ to the respirator facepiece~~s~~ .

8.4.3.2.1.3

For the certification of ensembles using loose-fitting, facepiece PAPR, the test samples shall include the full PAPR hood and headgear but shall exclude the blowers, battery packs, belts, breathing hoses, and canisters or cartridges. A filter adaptor or other means shall be used to close off the blower connectors to the respirator facepieces.

8.4.3.2.1.4

For the certification of ensembles using ~~APR~~ air-purifying respirators , the test samples shall include the respirator facepiece~~s,~~ but exclude the canister~~s~~ or cartridges. A filter adaptor or other means shall be used to close off the canister port~~s~~ on the respirator facepiece~~s~~ .

8.4.3.2.1.5

~~It shall be permitted to cut~~ Cutting open the ensemble for the purposes of routing the cabling from the instrumented manikin shall be permitted . Any areas that have been cut open shall be secured with staples ~~of similar means~~ to provide a relatively tight fit around the exiting manikin cables.

8.4.3.2.2

Samples shall be conditioned as specified in 8.1.2 for standard ensembles or ~~as specified in~~ 8.1.10 for Type R ensembles.

8.4.3.2.3

Where garments are evaluated, the sample ensemble shall be permitted to include other elements to protect exposed portions of the manikin, such as flame-resistant head coverings, insulated gloves, and insulated footwear.

8.4.3.3 Specimens.

8.4.3.3.1

Specimens shall be the complete protective ensembles specified in 8.4.3.2~~8.4.4.2.1~~ .

8.4.3.3.2

The size of the specimen~~s~~ shall be consistent with the manufacturer’s sizing information specific to the manikin’s dimensions.

8.4.3.3.2.1

If the recommended manufacturer’s sizing ~~is overlapping~~ overlaps multiple sizes, then the ~~smaller~~ smallest size shall be selected.

8.4.3.3.3

Three specimens shall be tested.

8.4.3.4 Procedure.

8.4.3.4.1

Specimens shall be tested in accordance with ASTM F1930, *Standard Test Method for Evaluation of Flame-Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin*, using an exposure heat flux of 84 kW/m^2 (2.02 cal/cm^2~~/~~ - sec) with ~~an exposure time of 3 seconds.~~ the following additional test specifications:

(1) The test exposure shall be calibrated using a nude instrumented manikin.

(2) An alternative manikin that is not the instrumented manikin specified in the standard following the calibration shall be permitted for evaluating ensembles or garments.

(3) Unless burn prediction measurements are performed, a lightweight, one-piece, flame-resistant coverall or any other type of lightweight clothing, including the normally specified 100 percent cotton underwear, shall be used to dress the manikin under the test ensemble or garment.

(4) If the donning of the ensemble or garment onto the manikin requires a portion of the ensemble or garment to be opened to permit the passage of cabling from the instrumented manikin to the data acquisition system, then a suitable technique shall be applied to close the ensemble or garment around the open area.

(5) An exposure time of 3 seconds shall be used.

(6) Immediately following exposure, with the ensemble or garment on the manikin, the ensemble or garment shall be observed for a length of time for any afterflame effects on any part of the ensemble or garment.

(7) After the manikin has cooled, the ensemble or garment shall be removed and inspected for any evidence of material or seam break open and evidence of thermal damage, including the dripping associated with melting.

(8) If material or seam break open is observed, the maximum length of the break open area shall be measured to the nearest 0.2 mm (0.05 in.).

8.4.3.4.2

If the ensemble or garment includes a visor that is worn over a respirator worn as part of the ensemble, the ensemble or garment shall be donned by a test subject that has physical dimensions consistent with the recommended dimensions for the size of the ensemble or garment.

8.4.3.4.2.1

Cutting the upper portion of the ensemble or garment to allow the test subject to more easily don the upper portion of the ensemble or garment shall be permitted.

8.4.3.4.2.2

The test subject shall have a minimum visual acuity of 20/20 in each eye, uncorrected or corrected with contact lenses, as determined in a visual acuity test or doctor's examination.

8.4.3.4.3

Visual acuity testing from within the ensemble shall be conducted using a standard 6.1 m (20 ft) eye chart with a normal lighting range of 100 to 150 foot-candles (fc) and with the test subject positioned at a distance of 6.1 m (20 ft) from the chart.

8.4.3.4.4

The test subject shall then read the standard eye chart through the lens of the SCBA facepiece and ensemble visor(s) to determine his or her visual acuity.

~~8.4.4.4.2~~

~~The manikin shall be dressed in 170 g/m^2 (5.0 oz/yd^2) (± 5 percent), jersey knit, 100 percent cotton underwear briefs and short-sleeved crew-neck T-shirts before the garment specimen is placed on the manikin.~~

8.4.3.5 Report.

~~8.4.4.5.1~~

~~The predicted second degree, third degree, and total percent body burn injuries for each specimen based on the total surface area covered by sensors, excluding hands and feet, shall be reported.~~

~~8.4.4.5.2~~

~~The average predicted second degree, third degree, and total body burn injuries of all specimens shall be calculated and reported.~~

8.4.3.5.1

The length and location of any afterflame shall be reported.

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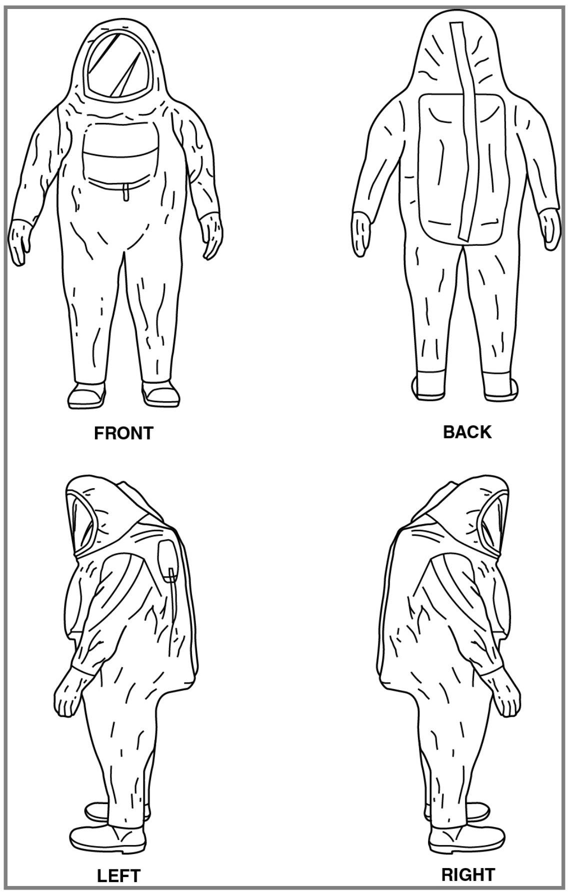
8.4.3.5.2

An illustration of the protective clothing or ensemble, as shown in Figure 8.4.3.5.2 , shall be prepared, and the location of any damage shall be recorded on the illustration and reported.

Figure 8.4.3.5.2 ~~Suit~~Garment Diagram (for noting damage location~~s~~).



8.4.3.5.2.1

The damage to be reported shall include but not be limited to the following:

(1) Break open of the material and seams

(2) Evidence of material dripping as the result of melting

(3) Delamination

(4) Destruction of any garment components

8.4.3.5.2.2

Photographs showing the areas of damage shall be permitted in lieu of a diagram.

8.4.3.5.2.3

If a hole is cut in the ensemble or garment for the purpose of allowing the passage of cabling from the manikin to the data acquisition system, then the area around the opening shall be excluded from the findings of material or seam break open.

8.4.3.5.3

The visual acuity of each test subject through the visor following the flash fire exposure of the ensemble or garment, if applicable, shall be reported.

8.4.3.6 Interpretation.

~~The average predicted body burn injuries shall be used to determine pass or fail performance for protective ensembles.~~

8.4.3.6.1

The maximum afterflame time among all the specimens shall be used to determine compliance with the afterflame requirement.

8.4.3.6.2

The visual acuity of the test subject inside the ensemble shall be used to determine pass or fail compliance with the post-flash fire simulation visual acuity requirements.

8.4.3.6.3

Observed dripping as the result of any melted element or component of the tested ensemble or garment shall constitute failure of the ensemble or garment.

8.4.3.6.4

Any measured seam or other area of break open with a maximum dimension of 50 mm (2 in.) shall constitute failure of the ensemble or garment.

8.4.3.7 Specific Requirements for Testing Garments, Hoods, Gloves, and Footwear.

Where garments, hoods, gloves, and footwear that do not cover the entire manikin are tested, items of clothing constructed of flame-resistant materials shall be used to cover those exposed portions of the manikin body in a manner that does not cover the item being evaluated.

8.4.3.8 Specific Requirements for Testing Class 2R, 3R, and 4R Ensembles.

Samples for Class Type R ensembles shall be conditioned as specified in 8.1.9 .

8.4.3.9 Specific Requirements for Measuring Burn Injury Predictions.

8.4.3.9.1

The manikin shall be dressed in 170 g/m^2 (5.0 oz/yd^2) (± 5 percent) of jersey knit, 100 percent cotton underwear briefs, and a short-sleeved crew-neck T-shirt before the garment specimen is placed on the manikin.

8.4.3.9.2

The individual and average predicted second degree, third degree, and total percent body burn injuries based on the total surface area covered by sensors, excluding hands and feet, for each specimen shall be reported.

8.4.3.9.3

A chart shall be prepared that shows the areas on the manikin where a second- or third-degree burn injury would be predicted.

~~**8.4.4** Thermal Manikin Test 2.~~

~~**8.4.4.1** Application.~~

~~This test method shall be applied to protective ensembles.~~

~~**8.4.4.2** Samples. (Reserved)~~

~~**8.4.4.3** Specimens.~~

~~**8.4.4.3.1**~~

~~Standard garments shall be prepared consisting of a long-sleeved coverall with a full-length zipper in the front. No pockets or cuffs shall be present. The test specimens shall meet the requirements of Section 8.2.2 in ASTM F1930,~~ ~~*Standard Test Method for Evaluation of Flame-Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin*~~ ~~.~~

~~**8.4.4.3.2**~~

~~Three specimens shall be tested.~~

~~**8.4.4.4**~~ ~~Procedure.~~

~~**8.4.4.4.1**~~

~~Specimens shall be tested in accordance with ASTM F1930,~~ ~~*Standard Test Method for Evaluation of Flame-Resistant Clothing for Protection Against Fire Simulations Using an Instrumented Manikin*~~ ~~, using an exposure heat flux of 84 kW/m ^{2} (2.02 cal/cm ^{2} /sec) with an exposure time of 3 seconds.~~

~~**8.4.4.4.2**~~

~~The manikin shall be dressed in 170 g/m ^{2} (5.0 oz/yd ^{2}) (± 5 percent), jersey knit, 100 percent cotton underwear briefs and short-sleeved crew-neck T-shirts before the garment specimen is placed on the manikin.~~

~~**8.4.4.5**~~ ~~Report.~~

~~**8.4.4.5.1**~~

~~The predicted second degree, third degree, and total percent body burn injuries for each specimen based on the total surface area covered by sensors, excluding hands and feet, shall be reported.~~

~~**8.4.4.5.2**~~

~~The average predicted second degree, third degree, and total body burn injuries of all specimens shall be calculated and reported.~~

~~**8.4.4.6**~~ ~~Interpretation.~~

~~The average predicted body burn injuries shall be used to determine pass or fail performance for protective ensembles.~~

Supplemental Information

File Name	Description	Approved
1990_SR_79_8.4.4_legislative.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Nov 05 19:44:14 EST 2020

Committee Statement

Committee Statement: The current propane-based test has limitations for how and where it can be performed and is subject to test-to-test variations that result in uneven exposures of test ensembles. The proposed modifications combine the stability and calibration features of the ASTM F1930 instrumented manikin test, for providing a more uniform exposure but are combined with the types of additional areas of criteria that had been applied for the current flash fire test. The proposed test further affords the opportunity to make body burn injury predictions as may be optionally reported for certain types of ensembles.

As part of this revision, the modified form of thermal manikin test 1 replaced the overall ensemble flash fire test but was also retitled.

Thermal manikin test two is not referenced in the performance requirements within Chapter 7 and was intended to be a place holder to offer the potential for applying instrumented manikin testing for predicting burn injury through the garment. The requirement for a standard overall garment to be used in this testing causes an undue burden for manufacturers to create both a garment that does not resemble their products and in some cases a coverall that would be difficult to manufacture.

Response Message: SR-79-NFPA 1990-2020

Public Comment No. 319-NFPA 1990-2020 [Section No. 8.4.5]

Public Comment No. 299-NFPA 1990-2020 [Section No. 8.4.5]

Public Comment No. 270-NFPA 1990-2020 [Section No. 8.4.4]

Public Comment No. 320-NFPA 1990-2020 [Section No. 8.4.4]

Public Comment No. 271-NFPA 1990-2020 [Section No. 8.4.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 160-NFPA 1990-2020 [Section No. 8.4.6.4.5]

8.4.4.4.5*

A pressure pot shall be used to evaluate the integrity of the specimen in the area of the flame application following the flame exposure. The pressure pot shall be a pressure vessel with dimensions that accommodate the entirety of the exposed specimen area and shall be designed with flanges that provide for the clamping of the specimen in a manner in which to create a seal against the outer surface of the specimen when the pot is subjected to a vacuum. The pressure pot shall have a fitting that provides for the evacuation of air inside the pot and for the measurement of pressure inside the pot. The volume of the pressure pot shall be no larger than 0.5 L (4 1⁄4 cups).

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Nov 10 12:33:03 EST 2020

Committee Statement

Committee Statement: The committee agreed with the submitter; however, implemented a maximum size for the test apparatus.

Response Message: SR-160-NFPA 1990-2020

Public Comment No. 315-NFPA 1990-2020 [Section No. 8.4.6.4.5]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 161-NFPA 1990-2020 [Section No. 8.5.7.8.2]

8.5.7.8.2

Specimens shall consist of each composite of the footwear upper used in the actual ensemble footwear configuration, excluding the tongue and gusset, with layers arranged in the proper order.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:34:29 EST 2020

Committee Statement

Committee Statement: Aligns the test areas with other standards in the project (1951, 1977, 1999).
Response Message: SR-161-NFPA 1990-2020

Public Comment No. 36-NFPA 1990-2020 [Section No. 8.5.7.8.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 162-NFPA 1990-2020 [Section No. 8.5.8.1.8.1]

8.5.8.1.8.1

Specimens shall consist of each composite of the footwear upper used in the actual ~~suit~~ garment footwear configuration, excluding the tongue and gusset, with layers arranged in proper order.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 12:35:13 EST 2020

Committee Statement

Committee Statement: Aligns the test areas with other standards in the project (1951, 1977, 1999).
Response Message: SR-162-NFPA 1990-2020

Public Comment No. 37-NFPA 1990-2020 [Section No. 8.5.8.1.8.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 58-NFPA 1990-2020 [Section No. 8.5.11.2]

8.5.11.2 Cold Temperature ~~Performance~~ Bend Test Two.

8.5.11.2.1 Application.

This test method shall apply to visor component materials.

8.5.11.2.2 Sample Preparation.

8.5.11.2.2.1

Samples shall be at least 1 m (1 yd) squares of material consisting of all layers.

8.5.11.2.2.2

Samples shall be conditioned as specified in 8.1.2.

8.5.11.2.3 Specimens.

8.5.11.2.3.1

Specimens shall be the size specified in ASTM D2136, *Standard Test Method for Coated Fabrics — Low-Temperature Bend Test*.

8.5.11.2.3.2

At least five specimens consisting of all layers shall be tested.

8.5.11.2.4 Procedure.

8.5.11.2.4.1

Specimens shall be tested in accordance with ASTM D2136~~, *Standard Test Method for Coated Fabrics — Low-Temperature Bend Test*~~ , with the following modifications:

(1) Specimens shall be conditioned for a minimum of 4 hours at –25°C ± 2°C (–13°F ± 4°F).

(2) The test shall be performed at a temperature of –25°C ± 2°C (–13°F ± 4°F).

8.5.11.2.4.2

Following this testing, specimens shall be examined for evidence of damage, including any breakage, cracks, tears, or separation, but not including discoloration along the folded area.

8.5.11.2.5 Report.

Observations of visible damage shall be recorded and reported for each specimen.

8.5.11.2.6 Interpretation.

8.5.11.2.6.1

Damage of any one specimen shall constitute failing performance.

8.5.11.2.6.2

Rigid visors that do not bend but show no evidence of damage shall still be considered to have passed the test.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 10:17:48 EDT 2020

Committee Statement

Committee Statement: The title of the test method was changed for consistency with the performance requirement. A decision was made not to modify the test method and extend it to other types of materials beyond visors.

Response Message: SR-58-NFPA 1990-2020

Public Comment No. 306-NFPA 1990-2020 [Section No. 8.5.11.2]

Public Comment No. 310-NFPA 1990-2020 [Section No. 8.5.11.2]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

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Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 59-NFPA 1990-2020 [Section No. 8.5.11.3]

~~**8.5.11.3** Cold Temperature Performance Test Three.~~

~~**8.5.11.3.1** Application.~~

~~**8.5.11.3.1.1**~~

~~This test shall apply to garment, glove, and elastomeric interface materials.~~

~~**8.5.11.3.1.2**~~

~~If the garment or glove element is constructed of several layers, then all layers, arranged in the correct order, shall be separately tested.~~

~~**8.5.11.3.2** Sample Preparation.~~

~~**8.5.11.3.2.1**~~

~~Samples shall be at least 1 m (1 yd) squares of material for garments and a sufficient amount of individual items for gloves and elastomeric interface materials to provide the required number of specimens.~~

~~**8.5.11.3.2.2**~~

~~Samples shall be conditioned as specified in 8.1.2 .~~

~~**8.5.11.3.3** Specimens.~~

~~**8.5.11.3.3.1**~~

~~Specimens shall be the size specified in ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing* .~~

~~**8.5.11.3.3.2**~~

~~A minimum of five specimens in each of the warp directions, machine or coarse, and the filling directions, cross-machine or wale, shall be tested.~~

~~**8.5.11.3.3.3**~~

~~Where the material is isotropic, 10 specimens shall be tested.~~

~~**8.5.11.3.4** Apparatus.~~

~~**8.5.11.3.4.1**~~

~~The flexing device specified in ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing* , shall be used.~~

~~**8.5.11.3.4.2**~~

~~A pressure pot shall be used to evaluate the integrity of the specimen in the area of the flame application following the flame exposure. The pressure pot shall be a pressure vessel with dimensions that accommodate the entirety of the exposed specimen area and be designed with flanges that provide for clamping of the specimen in a manner to create a seal against the outer surface of the specimen when the pot is subjected to a vacuum. The pressure pot shall have a fitting that provides for the evacuation of air inside the pot and for the measurement of pressure inside the pot. *(See A.8.4.6.4.5 .)*~~

~~**8.5.11.3.4.3**~~

~~A vacuum pump capable of connecting to the pressure pot and drawing a vacuum of at least 1 kPa (4 in. water gauge) shall be used.~~

~~**8.5.11.3.5** Procedure.~~

~~**8.5.11.3.5.1**~~

~~Specimens shall be tested as specified in ISO 7854, *Rubber- or plastics-coated fabrics — Determination of resistance to damage by flexing* , with the external side of the material facing outwards for a total of 200 cycles.~~

~~**8.5.11.3.5.2**~~

~~The specimen or portion of the specimen that has been repeatedly flexed shall be mounted in the pressure pot with the flame exposure side towards the interior of the pressure pot.~~

~~**8.5.11.3.5.3**~~

~~The pressure inside the pressure pot shall be reduced by 1 kPa ± 50 Pa (4 in. ± 0.2 in. water gauge).~~

~~**8.5.11.3.5.4**~~

~~After the vacuum has been applied to the pressure pot for 1 minute +5/−0 seconds, the change of pressure in the pressure pot shall be observed and recorded.~~

~~**8.5.11.3.6** Report.~~

~~The pressure change shall be reported for each specimen and as the average for each sample.~~

~~**8.5.11.3.7** Interpretation.~~

~~The average pressure change shall be used to determine pass or fail performance.~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 20 10:19:28 EDT 2020

Committee Statement

Committee Statement: The cold weather flexing test was added because of concerns that the test apparatus for the existing

cold temperature performance test one was no longer available. However, the proposed new cold

weather flexing test applies a flexing mechanism that is particularly aggressive (8 flexes per second) that is not representative of use. The committee decided to maintain the current cold temperature performance test until a suitable alternative could be identified and verified.

Response Message: SR-59-NFPA 1990-2020

Public Comment No. 313-NFPA 1990-2020 [New Section after 8.5.11.3]

Public Comment No. 268-NFPA 1990-2020 [Section No. 8.5.11.3]

Public Comment No. 296-NFPA 1990-2020 [Section No. 8.5.11.3]

Public Comment No. 307-NFPA 1990-2020 [Section No. 8.5.11.3]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters

5 Not Returned

28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 1-NFPA 1990-2020 [Section No. A.1.3]

A.1.3

Any authorities having jurisdiction (AHJs) incorporating NFPA 1991, NFPA 1992, NFPA 1994~~,~~ ~~NFPA 1999~~ , or any combination of the ~~four,~~ three can replace those references with chapter~~s~~ numbers and still reference similar content. For example, if an AHJ incorporated the 2016 edition of NFPA 1991 (i.e., "in accordance with the 2016 edition of NFPA 1991") and they wish to update to the latest information, they can do so by incorporating ~~Chapters 1 through 3 , Chapters 4 through 8 , and all related paragraphs of Annex A of~~ the chapters identified in Chapter 1 of the 2022 edition of NFPA 1990. ~~(i.e., "in accordance with Chapters 1 through 3 , Chapters 4 through 8 , and all related paragraphs of Annex A of the 2022 edition of NFPA 1990")~~

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Tue Oct 13 11:03:18 EDT 2020

Committee Statement

Committee Statement: Clarify the adoption of the individual standards NFPA 1991, 1992, and 1994 as they are part of 1990. Removed reference to NFPA 1999 which is being removed from NFPA 1990.

Response Message: SR-1-NFPA 1990-2020

Public Comment No. 17-NFPA 1990-2020 [Section No. A.1.3]

Public Comment No. 222-NFPA 1990-2020 [Sections A.1.3, A.3.2.1]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 128-NFPA 1990-2020 [Section No. A.3.3.84.2]

A.3.3.42.2 Liquefied Gas.

Examples of liquefied gases include, but are not limited to, ammonia, ~~1,2~~ 1,3 -butadiene, chlorine, ethylene oxide, hydrogen chloride, liquefied petroleum gas, and methyl chloride. This is not an inclusive list of liquefied gases. Testing in this standard is only conducted for a limited number of liquefied gases. Users should consult the technical data package to determine which liquefied gases have been tested with the ensemble's primary materials.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 08:30:25 EST 2020

Committee Statement

Committee Statement: Update definition to be more inclusive. Also compares back to the technical data package.

Response Message: SR-128-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 127-NFPA 1990-2020 [Section No. A.3.3.101]

~~**A.3.3.54** Liquefied Gas.~~

~~Examples of liquefied gases include, but are not limited to, ammonia, 1,2-butadiene, chlorine, ethylene oxide, hydrogen chloride, liquefied petroleum gas, and methyl chloride. Testing in this standard is only conducted for a limited number of liquefied gases. Users should consult the technical data package to determine which liquefied gases have been tested with the suit's primary materials.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 08:26:24 EST 2020

Committee Statement

Committee Statement: Duplicate annex information was removed.
Response Message: SR-127-NFPA 1990-2020

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.
Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 125-NFPA 1990-2020 [Section No. A.3.3.116]

A.3.3.64 Nonencapsulating Ensemble.

Criteria are provided in this standard for NFPA 1992-certified ensembles and NFPA 1994-certified ensembles to permit the certification of either an encapsulating protective ensemble, which fully encloses the individual wearer and their respirator, or a nonencapsulating ensemble, where the respirator (primarily the full facepiece) completes the enclosure of the individual wearer in conjunction with garments, gloves, and footwear. Certification of nonencapsulating ensembles requires that the manufacturer specify each type of respirator. Each combination of nonencapsulating ~~liquid splash-protective~~ ensemble and ~~respiratory~~ respirator must be evaluated for the relevant design and performance criteria of this standard.

~~In addition, the self-contained breathing apparatus (SCBA) is~~ Respirators are not evaluated to the chemical permeation or penetration resistance requirements that are applied to primary materials of ~~the liquid splash-protective ensemble~~ nonencapsulating ensembles. Organizations specifying and using nonencapsulating~~, liquid splash-protective~~ ensembles should take into consideration the absence of these performance criteria where performing a hazard and risk assessment for determining the appropriate use of ~~hazardous chemical~~ hazmat/CBRN protective ensembles.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Mon Nov 09 23:01:25 EST 2020

Committee Statement

Committee Statement: Changes were incorporated into the definition to account for the consolidation of standards.

Response Message: SR-125-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 139-NFPA 1990-2020 [Section No. A.4.1.1]

Global SR-167

A.1.1

~~No~~Currently, no single personal protective ensemble can ~~currently~~ protect the wearer from exposure to all hazards. OSHA/EPA Levels A, B, and C describe recommended personal protective ensembles. These levels are defined in ~~the~~ "Hazardous Waste Operations and Emergency Response ~~Standard (HAZWOPER)~~," 29 CFR 1910.120, Appendix B, as follows:

(1) Level A: ~~To be selected when~~When the greatest level of skin, respiratory, and eye protection is required.

(2) Level B: The highest level of respiratory protection is necessary, but a lesser level of skin protection is needed.

(3) Level C: The concentration(s) and type(s) of airborne substances is known and the criteria for using air-purifying respirators are met.

While these definitions provide guidelines and a framework for discussing personal protective equipment (PPE), the descriptive narrative ~~in~~of these levels does not set the minimum performance criteria required for specific threats, such as chemical permeation resistance and physical property characteristics. Thus, the use of these general levels of protection does not accurately describe the protective ability of such ensembles and does not assure that the wearer is adequately protected from any specific hazards. Relying solely on these ~~nomenclatures~~properties could result in exposure above acceptable exposure limits~~,~~ or an unnecessary reduction in operational effectiveness through a lack of mobility, decreased dexterity, or reduced operational mission duration. Proper selection of PPE for emergency response should be based on a careful assessment of the following two factors:

(1) The expected hazards and ~~anticipated~~ exposures anticipated to be ~~present~~ at the scene.

(2) The probable impact of those hazards based on the mission role of the emergency response organization.

Homeland Security Presidential Directive (HSPD) 8 defines personal protective equipment in terms of nationally recognized standards and NIOSH standards. ~~The~~ NFPA standards require third-party certification of products; product manufacturers ~~may~~might not claim compliance with them unless their product is fully certified~~,~~ and listed and labeled by an independent third-party certification organization in accordance with the standard. ~~The~~ NIOSH standards require government certification; and product manufacturers ~~may~~might not claim compliance with them unless their product is certified and listed and labeled by NIOSH. Several of these standards have already been officially adopted by the Department of Homeland Security.

The following information is provided to assist emergency response organizations in transitioning from ~~levels~~Levels A, B, and C to compliant, protection-based standards terminology. Because the OSHA/EPA levels are expressed in more general terms than the standards and do not include testing to determine protection capability, it is not possible to map the levels to specific standards. However, it is possible to look at specific configurations and suggest their OSHA/EPA level based on the definitions provided above. Some examples of ensembles and the approximate corresponding levels are provided in Table A.1.1.

~~Table A.1.1~~

~~Ensemble Description Using Performance-Based Standard(s)~~	~~OSHA/EPA Level~~
~~NFPA 1991, 2005 edition [CBR(N) protection now included in mandatory requirements], worn with NIOSH CBRN SCBA~~	~~A~~
~~NFPA 1991, 2000 edition with C/B optional requirements, worn with NIOSH CBRN SCBA~~	~~A~~
~~NFPA 1994 Class 1 worn with NIOSH CBRN SCBA~~	~~A~~
~~NFPA 1994 Class 2 worn with NIOSH CBRN SCBA~~	~~B~~
~~NFPA 1994 Class 2 worn with NIOSH CBRN APR~~	~~C~~
~~NFPA 1994 Class 3 worn with NIOSH CBRN SCBA~~	~~C~~
~~NFPA 1994 Class 3 worn with NIOSH CBRN APR~~	~~C~~

Table A.1.1 Suggested OSHA/EPA Levels

Ensemble Description Using Performance-Based Standard(s)	**OSHA/EPA Level**

Ensemble Description Using Performance-Based Standard(s)	OSHA/EPA Level
NFPA 1991 worn with NFPA 1981- or NFPA 1986-certified SCBA	A
NFPA 1994 Class 1 worn with NFPA 1981- or NFPA 1986-certified SCBA	A
NFPA 1994 Class 2/2R worn with NFPA 1981- or NFPA 1986-certified SCBA	B
NFPA 1992 worn with NFPA 1981- or NFPA 1986-certified SCBA	B
NFPA 1994 Class 2/2R worn with NIOSH CBRN APR or PAPR	C
NFPA 1992 worn with NIOSH CBRN APR or PAPR	C
NFPA 1994 Class 3/3R worn with NFPA 1981- or NFPA 1986-certified SCBA	B
NFPA 1994 Class 3/3R worn with NIOSH CBRN APR or PAPR	C
NFPA 1994 Class 4/4R worn with NFPA 1981- or NFPA 1986-certified SCBA	B
NFPA 1994 Class 4/4R worn with NIOSH CBRN APR or PAPR	C
NFPA 1994 Class 5 worn with NFPA 1981- or NFPA 1986-certified SCBA	B

Emergency response organizations ~~are cautioned~~should~~to~~ examine their hazard and mission requirements closely and select the appropriate performance standards. All PPE should be employed in accordance with federal OSHA standards, including those in 29 CFR 1910, Subpart H — "Hazardous Materials" (including 29 CFR 1910.120 — "Hazardous Waste Operations and Emergency Response") and 29 CFR 1910, Subpart I — "Personal Protective Equipment" (including 29 CFR ~~1901~~1910.134 — "Respiratory Protection")~~ that~~, which include requirements for safety and health plans, medical evaluation, and training.

Types of PPE and information on related standards, certifications, and products are~~ all~~ available on the DHS-sponsored *FEMA Responder Knowledge Base* web site: https://youth.gov/federal-links/fema-responder-knowledge-base.

Supplemental Information

File Name	Description	Approved
1990_SR_139_Table_4.1.1.docx	For staff use	

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 10:02:35 EST 2020

Committee Statement

Committee Statement: Updating the table for ruggedized and class 5.
Response Message: SR-139-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 140-NFPA 1990-2020 [Section No. A.4.4.1.1]

~~4.5.1~~

~~Users are cautioned that exposure of ensembles to CBRN agents and other highly hazardous materials should require disposal, particularly if the effectiveness of decontamination cannot be assessed.~~

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 10:32:55 EST 2020

Committee Statement

Committee Statement: Material is suitable to move to NFPA 1891 because it's selection material.
Response Message: SR-140-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 104-NFPA 1990-2020 [Section No. A.7.1.3.6.1]

Global SR-143

A.7.1.3.6.1

Total heat loss (THL) measures the heat transmitted or lost through a material or composite under a set of standard conditions specified by NFPA. The THL test measures and combines the heat that flows through a material or composite by conduction and evaporation. Table A.7.1.3.6.1 gives THL values for garment systems for which NFPA has set minimum performance requirements to provide a frame of reference for the THL value reported on the label of the ~~suit~~garment. Materials or composites with THL values below 200 W/m^2 have limited breathability and very limited ability to reduce heat stress. A manufacturer might designate a ~~suit~~garment as "breathable" by making marketing claims of breathability, heat stress relief, or comfort, for example. The authority having jurisdiction has the ultimate responsibility to determine the level of ~~suit~~garment breathability appropriate for anticipated environmental conditions based on a needs assessment.

Table A.7.1.3.6.1 Minimum Performance Requirements for Garment Systems

Clothing Type	W/m^2	W/m^2 Range of THL Values of Products Currently Available
Structural firefighting ~~clothing~~garments (NFPA 1971)	205	205–330
~~Rescue and recovery technical rescue gear~~Technical rescue garments with optional bloodborne pathogen protection (NFPA 1951)	450	450–550
~~EMS clothing~~Multiple use emergency medical garments (NFPA 1999)	450	450–700
Wildlands ~~clothing~~protective garments (NFPA 1977)	450	550–700
NFPA ~~1994–certified Class 3~~1994 Class 3 garments	200	200–450
~~NFPA 1994–certified Class 4~~NFPA 1994 Class 4 garments	450	450–700
NFPA 1994 Class 5 garments	325	* *At the time this edition was prepared, there were no NFPA 1994 Class 5 garments in existence.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Mon Nov 09 12:30:23 EST 2020

Committee Statement

Committee Statement: The specific annex for paragraph 7.1.3.6.1 required updating based on changes to referenced standards.

Modify Performance Requirements for THL based upon updated guidance. Change description of THL levels to Low/Moderate/High and add the Moderate Level of 325 W/m2. This level is commensurate with barrier blocking hoods in NFPA 1971 and is more realistic for products with increased insulation compared to a standard NFPA 1951 ensemble (450 W/m2).

Response Message: SR-104-NFPA 1990-2020

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

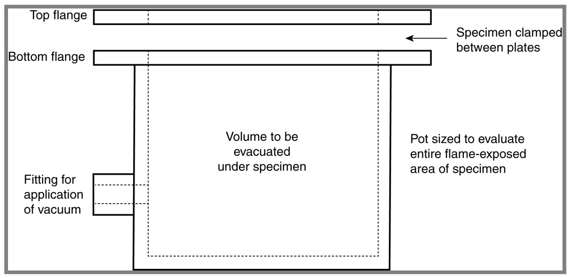
Ziskin, Michael

Second Revision No. 164-NFPA 1990-2020 [Section No. A.8.4.6.4.5]

A.8.4.4.4.5

An example of a pressure pot meeting the required specifications is shown in Figure A.8.4.4.4.5. The recommended minimum interior diameter of the pressure pot is 100 mm (4 in.). The effective volume of the pot shall be no larger than 0.5 L (4 1⁄4 cups).

Figure A.8.4.4.4.5 Design of Pressure Pot.



Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Wed Nov 11 08:10:17 EST 2020

Committee Statement

Committee Statement: The committee implemented a maximum size for the test apparatus in 8.4.6.4.5.
Response Message: SR-164-NFPA 1990-2020

Public Comment No. 314-NFPA 1990-2020 [Section No. A.8.4.6.4.5]

Ballot Results

This item has passed ballot

33 Eligible Voters
5 Not Returned
28 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 141-NFPA 1990-2020 [Chapter B]

Annex B Informational References

B.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

B.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

NFPA 1581, *Standard on Fire Department Infection Control Program*, ~~2015~~ 2022 edition.

NFPA 1891 , *Standard on Selection, Care, and Maintenance of Hazardous Materials Clothing and Equipment* , 2022 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2020 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services*, 2019 edition.

NFPA 1986, *Standard on Respiratory Protection Equipment for Tactical and Technical Operations*, 2017 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents* , ~~2005~~ 2016 edition.

NFPA 1992, *Standard on Liquid Splash–Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2018 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents*, 2018 edition.

NFPA 1999 , *Standard on Protective Clothing and Ensembles for Emergency Medical Operations* , 2018 edition.

B.1.2 Other Publications.

B.1.2.1 ANSI Publications.

American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI Z41, *American National Standard for Personal Protection — Protective Footwear*, 1999.

ANSI/ISEA Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices*, ~~2015~~ 2020 .

ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories*, ~~2015~~ 2020 .

ANSI/ISEA 207, *American National Standard for High-Visibility Public Safety Vests*, 2011.

B.1.2.2 ASTM Publications.

~~American Society for Testing and Materials~~ ASTM International , 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D572, *Standard Test Method for Rubber — Deterioration by Heat and Oxygen*, 2004, reapproved 2015.

ASTM D573, *Standard Test Method for Rubber — Deterioration in an Air Oven*, 2004, reapproved 2015.

ASTM D3045, *Standard Practice for Heat Aging of Plastics Without Load*, 2018.

ASTM F739, *Standard Test Method for Permeation of Liquids and Gases Through Protective Clothing Materials Under Conditions of Continuous Contact*, 2012e1.

ASTM F1001, *Standard Guide for Selection of Chemicals to Evaluate Protective Clothing Materials*, 2012, reapproved 2017.

ASTM F1052, *Standard Test Method for Pressure Testing Vapor Protective Suits*, 2014.

ASTM F1154, *Standard Practices for Evaluating the Comfort, Fit, Function, and Durability of Protective Ensembles, Ensemble Elements, and Other Components*, 2018.

ASTM F1868, *Standard Test Method for Thermal and Evaporative Resistance of Clothing Materials Using a Sweating Hot Plate*, 2017.

ASTM F1980, *Standard Guide for Accelerated Aging of Sterile Barrier Systems for Medical Devices*, 2016.

ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks*, ~~2019~~ 2020 .

ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear*, 2018.

B.1.2.3 DLA Publications.

Defense Logistics Agency, 8725 John J. Kingman Road, Fort Belvoir, VA 22060~~-6221~~ 6222 .

DLAR (JP) 4155.37, “Department of Defense (DoD) Shelf Life Material Quality Control Storage Standards,” 2015.

B.1.2.4 FEMA Publications.

Federal Emergency Management Agency, US Department of Homeland Security, 500 C Street, SW, Washington, DC 20472.

FEMA Responder Knowledge Base, https://youth.gov/federal-links/fema-responder-knowledge-base.

US Department of Homeland Security, *Presidential Policy Directive 8: National Preparedness* .

B.1.2.5 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO Guide 27, *Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity*, 1983, confirmed 2014.

ISO 9001, *Quality management systems — Requirements*, 2015.

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*, 2012.

ISO 2440, *Flexible and rigid cellular polymeric materials — accelerated ageing tests*, 1997.

~~**B.1.2.6** NMAB Publications.~~

~~National Materials Advisory Board, 2101 Constitution Ave, NW, Washington, DC 20418.~~

~~*Accelerated Aging of Materials and Structures: The Effects of Long-Term Elevated-Temperature Exposure* , 1996.~~

B.1.2.6 NAS Publications.

National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

National Academies Press, *The Use and Effectiveness of Powered Air Purifying Respirators in Healthcare*, 2015.

National Research Council, *Accelerated Aging of Materials and Structures: The Effects of Long-Term Elevated-Temperature Exposure*, 1996.

B.1.2.7 NIOSH Publications.

National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, GA 30333.

NIOSH, "Approved Particulate Filtering Facepiece Respirators."

NIOSH, "Improvement of Criteria for EMS Personal Protective Equipment."

NIOSH Respirator Selection Logic, 2004.

B.1.2.8 SAE Publications.

SAE International, Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

MIL-STD-810G, *Environmental Engineering Considerations and Laboratory Tests*, 2012.

B.1.2.9 US Government Publications.

US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 21, Code of Federal Regulations, Part 7, Subpart C, "Recalls (Including Product Corrections) — Guidance on Policy, Procedures, and Industry Responsibilities."

Title 21, Code of Federal Regulations, Part 878.4040, Subpart E, "Surgical Devices."

Title 29, Code of Federal Regulations, Part 1910.120, "Hazardous Waste Operations and Emergency Response."

Title 29, Code of Federal Regulations, Part 1910.132, "Personal Protective Equipment: General Requirements."

Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection."

Title 29, Code of Federal Regulations, Part 1910.1030, "Bloodborne Pathogens."

Title 29, Code of Federal Regulations, Part 1910, Subpart H, "Hazardous Materials."

Title 29, Code of Federal Regulations, Part 1910, Subpart I, "Personal Protective Equipment."

Title 42, Code of Federal Regulations, Part 84, "Approval of Respiratory Protective Devices."

Title 42, Code of Federal Regulations, Part 84, Subpart E, "Quality Control."

Title 42, Code of Federal Regulations, Part 84.41, "Quality Control Plans; Contents."

Federal Highway Administration (FHWA), *Manual on Uniform Traffic Control Devices (MUTCD)*, 2009.

~~NIOSH, *Certified Equipment List*.~~

~~NIOSH, "Improvement of Criteria for EMS Personal Protective Equipment."~~

B.1.2.10 US Naval Research Laboratory Publications.

US Naval Research Laboratory, Code 7600, 4555 Overlook Ave, SW, Washington, DC 20375.

Thomas E. Sutto, *Prioritization of the Percutaneous Hazard of Industrial Chemicals*, 2011.

Thomas E. Sutto, *Prioritization and Sensitivity Analysis of the Inhalation/Ocular Hazard of Industrial Chemicals*, 2011.

B.1.2.11 Other Publications.

Grotte, J. H., and L. I. Yang, “Report of the Workshop on Chemical Agent Toxicity for Acute Effects,” IDA Document D-2176, Institute for Defense Analysis, Alexandria, VA, May 1998.

NATO ~~Document No. 1268015.~~ AEP-52, “Assessment of Effect Levels of Classical Chemical Warfare Agents Applied to the Skin to Be Used in the Design of Protective Equipment.”

~~Sutto, T. E., NRL Document No. NRL/FR/6364–11-10,211, “Prioritization and Sensitivity Analysis of the Inhalation/Ocular Hazard of Industrial Chemicals,” October 2011.~~

~~Sutto, T. E., NRL Document No. NRL/FR/6364–11-10,213, “Prioritization of the Percutaneous Hazard of Industrial Chemicals,” October 2011.~~

TOP 8-2-501, *Permeation* ~~*Testing of Materials With*~~ *and Penetration of Air-Permeable, Semipermeable, and Impermeable Materials with Chemical Agents or Simulants (Swatch Testing)*, 2013.

US Army Center for Health Promotion and Preventative Medicine (USACHPPM) Report No. 47-EM-5863-04, *Acute Toxicity Estimation and Operational Risk Management of Chemical Warfare Agent Exposures.*

Beam, E. L., et al., “A method for evaluating health care workers’ personal protective equipment technique.” *American Journal of Infection Control* 39, no. 5 (2011): 415–420.

Bell, T., et al., “Ebola virus disease: The use of fluorescents as markers of contamination for personal protective equipment.” *IDCases* 2, no. 1 (2015): 27–30.

Casanova, L., et al., “Virus Transfer from Personal Protective Equipment to Healthcare Employees’ Skin and Clothing.” *Emerging Infectious Diseases* 14, no. 8 (2008): 1291–1293.

Cherrie, J. W., et al., “Use of qualitative and quantitative fluorescence techniques to assess dermal exposure.” *Annals of Occupational Hygiene* 44, no. 7 (2000): 519–522.

Fenske, R. A., “Visual scoring system for fluorescent tracer evaluation of dermal exposure.” Bulletin of Environmental Contamination and Toxicology 41, no. 5 (1988): 727–736.

Guo, Y. P., et al., “Environment and body contamination: a comparison of two different removal methods in three types of personal protective clothing.” *American Journal of Infection Control* 42, no. 4 (2014): pp. e39–e45.

Pan, Sung Ching, et al., “Assessing the thoroughness of hand hygiene: ‘Seeing is believing.’” *American Journal of Infection Control* 42, no. 7 (2014): 799–801.

Zamora, J., et al., “Contamination: A comparison of 2 personal protective systems.” *Canadian Medical Association Journal* 175, no. 3 (2006): 249–254.

Zellmer, C., S. Van Hoof, and N. Safdar. “Variation in health care worker removal of personal protective equipment.” *American Journal of Infection Control* 43, no. 7 (2015): 750–751.

B.2 Informational References.

AATCC 22, *Water Repellency: Spray Test*, 2017e.

AATCC 135, *Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics*, 2004.

ASTM D2136, *Standard Test Method for Coated Fabrics — Low-Temperature Bend Test*, 2019.

ASTM F739, *Standard Test Method for Permeation of Liquids and Gases through Protective Clothing Materials under Conditions of Continuous Contact*, 2012e1.

ASTM F2913, *Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester*, 2019.

B.3 References for Extracts. (Reserved)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Tue Nov 10 10:39:38 EST 2020

Committee Statement

Committee Statement: Update of editions of referenced publications, removal of referenced publications associated with the removal of NFPA 1999 and removal of referenced publications no mentioned in Annex A.

Response Message: SR-141-NFPA 1990-2020

Public Comment No. 254-NFPA 1990-2020 [Chapter B]

Ballot Results

✔ **This item has passed ballot**

33 Eligible Voters
5 Not Returned
27 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Allen, Jason L.

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Thompson, Donald B.

Affirmative All

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Kilinc-Balci, F. Selcen

NIOSH, Certified Equipment List could be listed under B.1.2.7 NIOSH Publications

NATIONAL FIRE PROTECTION ASSOCIATION
The leading information and knowledge resource on fire, electrical and related hazards

M E M O R A N D U M

TO: Technical Committee on Hazardous Materials Protective Clothing and Equipment

FROM: Yvonne Smith, *Committee Administrator*

DATE: February 18, 2021

SUBJECT: NFPA 1891 Second Draft Technical Committee FINAL Ballot Results (CustA2021)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot.

34 **Members Eligible to Vote**
4 **Members Not Returned** (*Del Re, D. Green, R. Greene, Wiseman*)

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for **each** revision**.**

To pass ballot, **each** revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $^{2}/_{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.

Second Revision No. 6-NFPA 1891-2020 [Global Comment]

Replace the phrase "hazmat/EMO" with "hazmat/CBRN/EMO" throughout the standard.

Submitter Information Verification

Committee:
Submittal Date: Thu Oct 29 10:29:10 EDT 2020

Committee Statement

Committee Statement: Hazmat/CBRN/EMO better clarifies what is covered in the standard.
Response Message: SR-6-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Wiseman, Darrell B

Affirmative All

Allen, Jason L.
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Thompson, Donald B.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 1-NFPA 1891-2020 [Section No. 1.1]

1.1 Scope.

1.1.1

This standard shall specify the minimum requirements for the selection, care, and maintenance of hazardous materials, CBRN, and emergency medical operations ~~protective~~ (hazmat/CBRN/EMO) ensembles~~,~~ and ensemble elements, ~~and hazmat/EMO PPE~~ that are used for protection during hazardous materials emergencies, CBRN incidents, and emergency medical operations, and are certified against NFPA 1999 or NFPA 1990 , which incorporates NFPA 1991 , NFPA 1992 , and NFPA 1994 .

1.1.1.1*

Individual clothing items addressed within this standard are limited to items certified against the NFPA 1992 and NFPA 1994 Class 5 portions of NFPA 1990 .

A.1.1.1.1

Garments certified against NFPA 1992 and NFPA 1994 Class 5 are not required to be tested as an ensemble.

1.1.1.2

Emergency medical operations (EMO) PPE addressed within this standard are limited to single-use and multiple-use ensembles certified against NFPA 1999 .

Global SR-6

1.1.2

This standard shall also specify requirements for hazmat/CBRN/EMO PPE manufactured to previous editions of NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.1.3

This standard shall not be construed as addressing all of the safety concerns associated with the use of compliant hazmat/CBRN/ EMO PPE. The persons and AHJs that use compliant hazmat/CBRN/ EMO PPE shall be responsible for establishing safety and health practices and for determining the applicability of regulatory limitations before use.

1.1.3.1

Compliance with this document is not intended to be a substitute for compliance with all applicable laws and regulations.

1.1.4

This standard shall not apply to initial life-safety operations where personnel take immediate action using available PPE to perform a rescue or evacuate an area following a preliminary risk analysis.

1.1.5

This standard shall not specify requirements, such as appropriate use of hazmat/CBRN/ EMO PPE for training, operations, or infection control, for other AHJ programs because these programs are under the jurisdiction of other NFPA standards.

1.1.6

This standard shall not apply to ~~protective~~ ensembles or ~~,~~ ensemble elements~~, or clothing~~ that are compliant with NFPA 1951, NFPA 1971, ~~and~~ NFPA 1977, and NFPA 2112 .

1.1.6.1

Products compliant with NFPA 1951 , NFPA 1971 , NFPA 1977 , and NFPA 2112 shall be permitted for use in certain hazmat/CBRN/EMO due to their unique protection capabilities.

1.1.7

This standard shall not apply to ~~protective~~ ensembles or ~~,~~ ensemble elements~~, or clothing~~ for protection against ionizing radiation, cryogenic liquid hazards, or explosive atmospheres.

1.1.8

Nothing herein shall restrict any jurisdiction from exceeding these minimum requirements.

Supplemental Information

File Name	Description	Approved
1891_SR_1_1.1.docx	For Staff Use.	

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Thu Oct 29 09:20:39 EDT 2020

Committee Statement

Committee Statement: Clarify that NFPA 1891 covers NFPA 1990 in its entirety (including NFPA 1991, NFPA 1992, and NFPA 1994) as well as the ensemble section of NFPA 1999. Further clarifies NFPA 1891 does not cover the individual clothing items certified against NFPA 1999. Clarify products meeting NFPA 1951, NFPA 1971, NFPA 1977, and NFPA 2112 may be recommended for use in operations requiring flame resistance.

Provide consistency in wording across the document.

Response Message: SR-1-NFPA 1891-2020

Public Comment No. 7-NFPA 1891-2020 [Section No. 1.1]

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 2-NFPA 1891-2020 [Section No. 1.2]

1.2 Purpose.

Global SR-6

1.2.1

The purpose of this standard shall be to establish procedures as part of a program to provide selection, care, and maintenance requirements for hazmat/CBRN/EMO PPE to reduce the safety risks and potential health risks associated with poorly selected, poorly maintained, contaminated, and/or damaged hazardous materials,~~ and~~ CBRN, and emergency medical operations protective equipment.

1.2.2

This standard shall establish a basic criteria for selecting, inspecting, cleaning, decontaminating, repairing, storing, and retiring hazmat/CBRN/ EMO PPE compliant with the requirements of NFPA 1999 or NFPA 1990 , which consolidates NFPA 1991, NFPA 1992, and NFPA 1994~~, and NFPA 1999~~ .

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 09:58:38 EDT 2020

Committee Statement

Committee Statement: Provide consistency in language across the document.
Response Message: SR-2-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 3-NFPA 1891-2020 [Section No. 1.3]

1.3 Application.

1.3.1

This standard shall apply to hazmat/CBRN/ EMO PPE that is certified compliant in accordance with NFPA 1999 or NFPA 1990 , which consolidates NFPA 1991, NFPA 1992, and NFPA 1994~~, and NFPA 1999~~ .

Global SR-6

1.3.2

This standard shall also apply to hazmat/CBRN/EMO PPE that is manufactured to previous editions of NFPA 1991, NFPA 1992, NFPA 1994, and NFPA 1999.

1.3.3

This standard shall not apply to other organizational programs such as the appropriate use of training, operations, or infection control because these programs are under the jurisdiction of other NFPA standards.

1.3.4

This standard shall not apply to respiratory protective equipment other than where such equipment interfaces with ~~hazardous materials and CBRN~~ hazmat/CBRN/EMO protective ensembles.

1.3.5

Requirements of this standard shall not apply to accessories attached to any element of the hazmat/CBRN/ EMO PPE unless specifically addressed herein.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:02:33 EDT 2020

Committee Statement

Committee Statement: Provide consistency in language across the document.
Response Message: SR-3-NFPA 1891-2020

Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 4-NFPA 1891-2020 [Section No. 1.4]

1.4 Responsibility.

1.4.1

To ensure the greatest possible protection of the organization's employees at the scene of a hazardous materials ~~emergency or CBRN~~ , CBRN, or emergency medical incident, both employers and employees shall collaborate to establish and maintain a safe and healthy work environment.

1.4.2

At a minimum, employers shall be responsible for the following:

(1) Performing a hazard analysis at the scene of a hazardous materials ~~emergency or CBRN~~ , CBRN, or emergency medical incident to identify and control physical and health hazards

(2) Identifying and providing appropriate PPE for employees

(3) Advising employees of the hazards they face and the limitations of the selected PPE

(4) Training employees in the use and care of PPE

(5) Maintaining PPE, including replacing worn or damaged PPE

(6) Periodically reviewing, updating, and evaluating the effectiveness of the PPE program

1.4.3

At a minimum, employees shall be responsible for the following:

(1) Wearing PPE properly

(2) Attending training sessions on PPE

(3) Ensuring proper care, cleaning, and maintenance of PPE

(4) Informing a supervisor of the need to repair or replace PPE

(5) Informing a supervisor when they have questions about their PPE

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:08:06 EDT 2020

Committee Statement

Committee Statement: Provide consistency in language across the document.
Response Message: SR-4-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All

0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 5-NFPA 1891-2020 [Section No. 1.5]

1.5 Implementation.

1.5.1

When the standard is adopted by an ~~organization or by a jurisdiction~~ AHJ , the ~~authority having jurisdiction~~ AHJ shall set a date or dates for achieving compliance with the requirements of this standard.

1.5.2

The ~~organization or the jurisdiction~~ AHJ shall be permitted to establish a phase-in schedule for compliance with specific requirements of this standard.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:13:21 EDT 2020

Committee Statement

Committee Statement:	The term AHJ has been used to ensure consistency for the responsible entity in this standard.
Response Message:	SR-5-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Thompson, Donald B.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 7-NFPA 1891-2020 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The following documents or portions thereof are referenced in this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are listed in Annex B.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 470, *Hazardous Materials/Weapons of Mass Destruction (WMD) Standards for Responders,* 2022 edition.

NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2018 edition.

NFPA 473, *Standard for Competencies for EMS Personnel Responding to Hazardous Materials/Weapons of Mass Destruction Incidents,* 2018 edition.

NFPA 475, *Recommended Practice for Organizing, Managing, and Sustaining a Hazardous Materials/Weapons of Mass Destruction Response Program,* ~~2017~~ 2022 edition.

NFPA 1072, *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications,* 2017 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program,* 2018 edition.

NFPA 1581, *Standard on Fire Department Infection Control Program,* 2021 edition.

NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2020 edition.

NFPA 1855, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Technical Rescue Incidents,* 2018 edition.

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents,* 2020 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting,* 2018 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting and Urban Interface Fire Fighting* , 2022 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,* 2019 edition.

NFPA 1986, *Standard on Respiratory Protection Equipment for Tactical and Technical Operations,* 2017 edition.

NFPA 1990, *Standard for Protective Ensembles and Ensemble Elements for Hazardous Materials, CBRN, and Emergency Medical Response,* 2022 edition.

NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Terrorism Incidents,* 2016 edition.

NFPA 1992, *Standard on Liquid Splash–Protective Ensembles and Clothing for Hazardous Materials Emergencies,* 2018 edition.

NFPA 1994, *Standard on Protective Ensembles for First Responders to Hazardous Materials Emergencies and CBRN Terrorism Incidents,* 2018 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations,* 2018 edition.

NFPA 2112, *Standard on Flame-Resistant Clothing for Protection of Industrial Personnel Against Short-Duration Thermal Exposures from Fire,* 2018 edition.

2.3 Other Publications.

~~**2.3.1** AATCC Publications.~~

~~American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.~~

~~TM 127, *Water Resistance: Hydrostatic Pressure Test,* 2017.~~

2.3.1 ANSI Publications.

American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI/ASQ Z1.4, *Sampling Procedures and Tables for Inspection by Attributes*, 2003 (R2018).

2.3.2 ASTM Publications.

ASTM International, 100 Bar Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM F1052, *Test Method for Pressure Testing Vapor Protective Suits,* 2014.

2.3.3 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*, 1999.

2.3.4 NIOSH Publications.

National Institute for Occupational Safety and Health, Patriots Plaza 1, 395 E Street, SW, Suite 9200, Washington, DC 20201.

Statement of Standard for NIOSH CBRN APR Testing, 2003.

Statement of Standard for NIOSH CBRN PAPR Testing, 2006.

Statement of Standard for NIOSH CBRN SCBA Testing, 2003.

2.3.5 United Nations Publications.

United Nations, 1775 K Street, Suite 500, Washington, DC 20006.

Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 2011.

2.3.6 U.S. Government Publications.

U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 29, Code of Federal Regulations, Part 1910.120, “Hazardous Waste Operations and Emergency Response.”

Title 29, Code of Federal Regulations, Part 1910.134, “Respiratory Protection.”

Title 29, Code of Federal Regulations, Part 1910.1030, “Bloodborne Pathogens.”

Title 42, Code of Federal Regulations, Part 84, “Respiratory Protective Devices.”

U.S. Department of Transportation “Nine Classes of Hazardous Materials,” 2014. https://www.fmcsa.dot.gov/regulations/enforcement/nine-classes-hazardous-materials-yellow-visor-card

https://www.fmcsa.dot.gov/regulations/enforcement/nine-classes-hazardous-materials-yellow-visor-card.

2.3.7 Other Publications.

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003 Edition.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:33:52 EDT 2020

Committee Statement

Committee Statement:	Updates to editions of standards as well as new standards being referenced based on task group work.
Response Message:	SR-7-NFPA 1891-2020

Public Comment No. 12-NFPA 1891-2020 [Chapter 2]

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
29 Affirmative All
1 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Affirmative with Comment

Kilinc-Balci, F. Selcen

It may be more appropriate to reference the NIOSH publications by removing the "Testing" from the titles in 2.3.4 (since SOS include other details such as labeling, quality assurance, etc. in addition to the testing): Statement of Standard for NIOSH CBRN APR, 2003 Statement of Standard for NIOSH CBRN PAPR, 2006 Statement of Standard for NIOSH CBRN SCBA, 2003 These three SOS documents were also referenced in 5.1.2 (correctly)

Second Revision No. 41-NFPA 1891-2020 [New Section after 3.3.5]

3.3.6 CBRN.

The abbreviation used for “chemical, biological, radiological, and nuclear.”

3.3.7 CBRN Terrorism Incidents.

Situations involving the intentional or accidental release of CBRN agents in civilian areas.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:28:57 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-41-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Wiseman, Darrell B

Affirmative All

Allen, Jason L.
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas

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Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Stull, Jeffrey O.

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Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 36-NFPA 1891-2020 [Section No. 3.3.7]

Global SR-6

3.3.9 Cleaning.

The act of removing soil and contamination from protective clothing, protective ensembles, and ensemble elements by mechanical, chemical, thermal, or combined processes.

3.3.9.1* General Cleaning.

A specific process applied for removing soil from the wearing of hazmat/CBRN/EMO PPE that has not been exposed to hazardous substances requiring decontamination.

A.3.3.9.1 General Cleaning.

General cleaning is intended for those circumstances where emergency responders wear hazmat/CBRN/EMO PPE either during training where no contact with contaminants occurs, or in hazardous materials, CBRN, or emergency medical operations where there is no exposure to hazardous substances that requires either advanced cleaning or decontamination.

If specific hazmat/CBRN/EMO PPE is designated by the manufacturer for single use and the single use is defined by the manufacturer as a single wearing, then general cleaning is not applied.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Fri Nov 13 10:21:56 EST 2020

Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.

Response Message: SR-36-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

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Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 8-NFPA 1891-2020 [Section No. 3.3.8]

3.3.10* Compliant Product.

A product that is covered by NFPA 1891 and has been certified as meeting all applicable requirements of ~~NFPA 1891 that pertain to the product~~ NFPA 1999 or NFPA 1990 , which consolidates NFPA 1991 , NFPA 1992 , and NFPA 1994 .

A.3.3.10 Compliant Product.

For the purpose of NFPA 1891, this standard applies to hazmat/CBRN/EMO PPE, including protective ensembles and ensemble elements certified to NFPA 1999 or NFPA 1990 , which consolidates ~~to~~ NFPA 1991, NFPA 1992, and NFPA 1994~~, and NFPA 1999~~ .

Submitter Information Verification

Committee: FAE-HAZ
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Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.

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Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Wiseman, Darrell B

Affirmative All

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Zeigler, James P.

Ziskin, Michael

Second Revision No. 9-NFPA 1891-2020 [Section No. 3.3.12]

3.3.14* Decontamination.

The physical and/or chemical process of reducing ~~the amount~~ and preventing the spread and effects of ~~hazardous~~ contaminants to people, animals, the environment, or equipment involved at a ~~hazardous materials emergency or a CBRN~~ hazmat/CBRN/EMO incident.

A.3.3.14 Decontamination.

Three types of decontamination (commonly known as “decon”) are performed by emergency responders: emergency, mass, and technical. Decontamination performed sometimes on victims in a hospital setting is referred to as definitive decontamination, but ~~that~~ is not covered in this standard.

Gross decontamination is a phase of decontamination where significant reduction of the amount surface contamination takes place as quickly as possible. This is usually accomplished by mechanical removal of the contaminant or initial rinsing from handheld hose lines, emergency showers, or other nearby sources of water.

Gross decontamination is performed on the following:

(1) Team members before their technical decontamination

(2) Emergency responders before leaving the incident scene

(3) Victims during emergency decontamination

(4) Persons requiring mass decontamination

(5) Personal protective equipment (PPE) used by emergency responders before leaving the scene

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:51:50 EDT 2020

Committee Statement

Committee Statement: Coordination with definitions in NFPA 470.
Response Message: SR-9-NFPA 1891-2020

Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

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Affirmative All

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Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 42-NFPA 1891-2020 [New Section after 3.3.13]

3.3.16* Emergency Medical Operations (EMO).

The provision of emergency patient care and transportation prior to arrival at a medical care facility by emergency medical responders, emergency patient care by medical first receivers at a medical care facility, and body recovery by emergency medical responders.

A.3.3.16 Emergency Medical Operations (EMO).

Emergency medical operations include the provision of emergency patient care by emergency medical responders and medical first receivers. For emergency medical responders, this care might be provided at the scene of an accident or in the transport of patients to a medical facility. For medical first receivers, care is generally provided at a medical facility, although medical first receivers might also provide emergency patient care at various temporary emergency medical facilities. Body recovery is included as emergency medical operations, because some patients could die in the course of treatment, and some events, including large-scale disasters, could require body removal in which significant blood-borne or airborne pathogen hazards exist.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:31:00 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-42-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

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Clifford, Brian J.

Dugan, Nicholas

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Geiger, Troy A.

Harkness, Allen Ira

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Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 43-NFPA 1891-2020 [New Section after 3.3.13]

3.3.17* Emergency Responders.

Personnel assigned to organizations that have the responsibility for responding to hazardous materials emergencies and CBRN terrorism incidents.

A.3.3.17 Emergency Responders.

Emergency responders include medical services providers, law enforcement officers, firefighters, volunteer firefighters or officers of a nonprofit volunteer fire company, emergency medical technicians, emergency nurses, ambulance operators, providers of civil defense services, or any other personnel who render mitigation, isolation, emergency care, or other forms of assistance at the scene of a hazardous materials emergency or CBRN terrorism incident, including post-event clean-up and recovery activities.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:31:59 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-43-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 44-NFPA 1891-2020 [New Section after 3.3.13]

3.3.21 Exhaust Valve.

A one-way vent that releases exhaust to the outside environment and prevents entry of the outside environment.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:33:30 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-44-NFPA 1891-2020

Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira
Hedstrom, Olaf
Hirschey, Ryan C.
Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
Monaco, Michael
Newsom, Amanda H.
Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Thompson, Donald B.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 45-NFPA 1891-2020 [New Section after 3.3.13]

3.3.19 Ensemble.

Multiple ensemble elements that when worn together are designed to provide minimum full-body protection from some, but not all, risks that occur during hazardous materials emergencies, CBRN terrorism incidents, and emergency medical operations. *(See also 3.3.20 , Ensemble Elements)* .

3.3.19.1 NFPA 1991–Certified Ensembles (and Ensemble Elements).

3.3.19.1.1* Vapor-Protective Ensemble.

Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some, but not all, risks of vapor, liquid splash, and particulate environments during hazardous materials emergencies and CBRN terrorism incidents in vapor, gas, liquid, or particulate forms.

A.3.3.19.1.1 Vapor-Protective Ensemble.

The vapor-protective ensemble elements are the suit, gloves, and footwear.

3.3.19.1.2* Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for limited protection against chemical flash fire for escape only.

A.3.3.19.1.2 Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape Protection.

Ensembles meeting these requirements are intended to offer the wearer limited protection for escape only, in situations that can result in chemical flash fires. This requirement does not imply any protection for any firefighting activities but offers minimum protection from the thermal effects of a chemical flash fire.

3.3.19.1.3 Vapor-Protective Ensemble with Optional Chemical Flash Fire Escape and Liquefied Gas Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for both limited protection against chemical flash fire for escape only and for protection against liquefied gases.

3.3.19.1.4* Vapor-Protective Ensemble with Optional Liquefied Gas Protection.

A compliant vapor-protective ensemble that is also certified as compliant with the optional requirements for protection against liquefied gases.

A.3.3.19.1.4 Vapor-Protective Ensemble with Optional Liquefied Gas Protection.

Ensembles meeting these requirements are intended to offer the wearer limited protection for exposure to liquefied gases for a maximum exposure time of 15 minutes.

3.3.19.1.5* Vapor-Protective Footwear.

The ensemble element of the protective ensemble that provides chemical protection and physical protection to the feet, ankles, and lower legs.

A.3.3.19.1.5 Vapor-Protective Footwear.

Vapor-protective footwear includes boots or outer boots worn in conjunction with socks.

3.3.19.1.6 Vapor-Protective Gloves.

The ensemble element of the protective ensemble that provides chemical protection to the hands and wrists.

3.3.19.2 NFPA 1992–Certified Ensembles (and Ensemble Elements).

3.3.19.2.1* Liquid Splash–Protective Ensemble.

Multiple elements of compliant protective clothing and equipment products that when worn together provide protection from some, but not all, risks of hazardous materials emergencies involving liquids to the torso, legs, arms, head, hands, and feet.

A.3.3.19.2.1 Liquid Splash–Protective Ensemble.

Liquid splash–protective ensemble elements include, but are not limited to, the garments, gloves, and footwear.

3.3.19.2.2* Liquid Splash–Protective Footwear.

The element of the protective ensemble, or the item of protective clothing that provides liquid chemical protection and physical protection to the feet, ankles, and lower legs.

A.3.3.19.2.2 Liquid Splash–Protective Footwear.

Liquid splash–protective footwear includes boots, or outer boots in conjunction with socks.

3.3.19.2.3* Liquid Splash–Protective Garment.

The element of the protective ensemble or the item of protective clothing that provides liquid chemical protection to the upper and lower torso, arms, and legs, excluding the head, hands, and feet.

A.3.3.19.2.3 Liquid Splash–Protective Garment.

Liquid splash–protective garments include coveralls, multi-piece splash suits, encapsulating ensembles, and nonencapsulating ensembles.

3.3.19.2.4 Liquid Splash–Protective Gloves.

The element of the protective ensemble, or the item of protective clothing that provides liquid chemical protection to the hands and wrists.

3.3.19.2.5* Liquid Splash–Protective Hood.

The element of the protective ensemble or an item of protective clothing that provides liquid chemical protection and physical protection to the head and neck.

A.3.3.19.2.5 Liquid Splash–Protective Hood.

Hoods used for liquid splash protection during hazardous materials emergencies can have several different configurations that include, but are not limited to, the following:

(1) The hood can be a separate item of protective clothing that covers the head and neck of the wearer and includes a face opening for a respirator to provide complete head and neck protection.

(2) The hood can be a separate item of protective clothing that includes a visor, with a respirator worn under the hood.

(3) The hood can be a loose-fitting facepiece powered air-purifying respirator (PAPR) that includes a hood or other materials that enclose the wearer's head and neck while also providing respiratory protection. In this configuration, the PAPR is certified by the National Institute for Occupational Safety and Health (NIOSH) for respiratory protection; however, the hood is addressed in this standard as a separate item of clothing or as an element of an ensemble and is subject to separate labeling, design, and performance requirements.

3.3.19.3 NFPA 1994–Certified Ensembles (and Ensemble Elements).

3.3.19.3.1 Class 1 Hazmat/CBRN Protective Ensemble.

An ensemble comprising ensemble elements that when worn together are designed to protect emergency responders at hazardous materials emergencies and CBRN terrorism incidents involving vapor or liquid chemical hazards where concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).

3.3.19.3.2 Class 2 Hazmat/CBRN Protective Ensemble.

An ensemble comprising ensemble elements that when worn together are designed to protect emergency responders at hazardous materials emergencies and CBRN terrorism incidents involving vapor or liquid chemical hazards where concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).

3.3.19.3.3 Class 3 Hazmat/CBRN Protective Ensemble.

An ensemble comprising ensemble elements that when worn together are designed to protect emergency responders at hazardous materials emergencies and CBRN terrorism incidents involving low levels of vapor or liquid chemical hazards where concentrations are below immediately dangerous to life and health (IDLH), permitting the use of CBRN air-purifying respirators (APR) or CBRN-powered air-purifying respirators (PAPR).

3.3.19.3.4 Class 4 Hazmat/CBRN Protective Ensemble.

An ensemble comprising ensemble elements that when worn together are designed to protect emergency responders at hazardous materials emergencies and CBRN terrorism incidents involving biological or radiological particulate hazards where concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR) or powered air-purifying respirators (PAPR).

3.3.19.3.5 Class 5 Hazmat/CBRN Protective Ensemble.

An ensemble comprising ensemble elements that when worn together are designed to protect emergency responders at hazardous materials emergencies and CBRN terrorism incidents involving non-skin toxic, flammable gases where the potential exists for chemical flash fires and further requiring the use of self-contained breathing apparatus (SCBA).

3.3.19.4 NFPA 1999–Certified Protective Ensembles.

3.3.19.4.1* Multiple-Use Emergency Medical Protective Ensemble.

Multiple elements of compliant protective clothing and equipment providing full body coverage intended for multiple use that when worn together provide protection from some, but not all, risks of emergency medical operations.

A.3.3.19.4.1 Multiple-Use Emergency Medical Protective Ensemble.

Multiple-use medical protective ensembles are intended for high-risk applications where no exposed skin is permitted and the majority of the elements can be reused, if properly cleaned and decontaminated. High-risk applications include situations where there is an increased likelihood of contacting individuals or contaminated items where exposure to contaminated fluids can occur. The risk of exposure increases based on the amount and reliability of information available if an individual is infected with a liquid-borne pathogen, the expected proximity of the wearer to the affected individual, the duration the wearer might be in proximity to an infected individual, and the likelihood of any exposure with contaminated liquids or waste as part of the operations.

Multiple-use protective ensembles further offer a higher degree of ruggedness and resistance to physical hazards. These ensembles consist of a multiple-use emergency medical garment that can be a coverall with or without a hood, or multiple garments that can include a hood. Hand protection is provided by the combination of a single-use examination glove worn underneath either a single-use emergency medical cleaning/utility glove or a multiple-use emergency medical work glove.

Foot protection is provided by multiple-use emergency medical or multiple-use medical care facility footwear. Footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 can be substituted, since these items have demonstrated material, seam, and overall product biopenetration resistance, integrity, and physical hazard resistance that is equivalent or greater than multiple-use emergency medical footwear specified in NFPA 1999 . Garments that include sock extensions as part of their construction can be used with any footwear that meets ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear.*

Single-use emergency medical footwear covers can be provided but are not required for the certification of these ensembles.

These covers are suggested for minimizing contamination to more durable, reusable footwear. Eye or face protection is provided by either (1) a NIOSH-approved full facepiece air-purifying respirator (APR) with P100 filters, or (2) a NIOSH-approved appropriate tight- or loose-fitting powered air-purifying respirator (PAPR) with a protection level of HE.

Alternative respiratory protective equipment can include CBRN APR, CBRN PAPR, or SCBA that is certified to NFPA 1981 .

3.3.19.4.2* Single-Use Emergency Medical Protective Ensemble.

Multiple elements of compliant protective clothing and equipment providing full-body coverage intended for a single use that when worn together provide protection from some, but not all, risks of emergency medical operations.

A.3.3.19.4.2 Single-Use Emergency Medical Protective Ensemble.

Single-use medical protective ensembles are intended for applications where no exposed skin is permitted and the majority of the elements, including the garment, gloves, footwear covers, and certain eye and face protection devices are disposable after use. These ensembles include a single-use medical protective garment that might be a coverall with or without a hood, or separate garments that can include a hood. These ensembles include two pairs of any NFPA 1999 –certified single-use emergency medical examination gloves.

The use of double gloving is a precaution intended to offer additional protection and minimize the risk of cross contamination during doffing.

These ensembles are also either configured with multiple-use emergency medical or multiple-use medical care facility footwear or single-use emergency medical footwear covers worn over standard footwear.

Footwear certified to NFPA 1951 , NFPA 1971 , NFPA 1991 , NFPA 1992 , or NFPA 1994 can be substituted since these items have demonstrated material, seam, and overall product biopenetration resistance, integrity, and physical hazard resistance that is equivalent or greater than multiple-use emergency medical footwear specified in NFPA 1999 .

If single-use footwear covers are used as part of the ensemble, it is recommended that additional physical foot protection be achieved by the use of footwear that complies with ASTM F2413, *Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear* . Garments that include bootie foot extensions as part of their construction can be used with any footwear that meets ASTM F2413. Eye and face protection is provided by a combination of emergency medical eye and face protection devices that can include goggles and faceshields that comply with ANSI Z87.1, *American National Standard for Occupational and Educational Personal Eye and Face Protection Devices* requirements, and respirators approved by NIOSH as N95 filtering facepieces that further demonstrate fluid resistance. Single-use medical protective ensembles can also be configured with the types of respirators established for multiple-use protective ensembles.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:36:21 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-45-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments

0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 10-NFPA 1891-2020 [Section No. 3.3.14]

3.3.18 Encapsulating Ensemble .

A ~~protective ensemble providing vapor tight or liquid tight protection to the upper and lower torso, head, arms, hands, legs, and feet and~~ type of ensemble that completely ~~covering~~ covers the wearer and the wearer's respirator.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 10:56:44 EDT 2020

Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.
Response Message: SR-10-NFPA 1891-2020

Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Wiseman, Darrell B

Affirmative All

Allen, Jason L.
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.

Geiger, Troy A.
Harkness, Allen Ira
Hedstrom, Olaf
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Kennedy, Jeffrey
Kerbow, Kyle
Kilinc-Balci, F. Selcen
Lakomiak, Paul S.
Lancaster, Beth C.
Lehtonen, Karen E.
Mann, Philip C.
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Nystrom, Ulf
O'Connor, James T.
Salvato, Michael
Shelton, Robert E.
Shoaf, Richard C.
Stull, Jeffrey O.
Thompson, Donald B.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 37-NFPA 1891-2020 [Sections 3.3.15, 3.3.16]

3.3.20 Ensemble Elements.

Garment(s), gloves, footwear, hood(s), ~~etc.,~~ and other clothing and equipment items used to assemble a complete protective ensemble.

3.3.20.1 Faceshield.

A hazardous materials protective component intended to help protect a portion of the wearer's face, not intended as primary eye protection.

3.3.20.2 Footwear.

The element of the protective ensemble that provides protection to the foot, ankle, and lower leg.

3.3.20.3 Footwear Cover.

The item of the protective ensemble to be worn over standard footwear that provides a barrier and physical protection to the wearer's feet, and possibly ankles and lower legs.

3.3.20.4 Garment(s).

The element or elements of the protective ensemble that provides protection to the upper and lower torso, arms, and legs and possibly the head~~;~~ , excluding the hands and feet.

3.3.20.5 Gloves.

The element of the protective ensemble that provides protection to the wearer's hands and wrists.

3.3.20.6 Hood.

The element of the protective ensemble that provides protection to the wearer's head and neck.

3.3.20.7 Sock.

An extension of the garment or suit leg or a separate item that covers the entire foot and ankle and is intended to be worn inside a protective outer boot.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Fri Nov 13 13:54:38 EST 2020

Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.

Response Message: SR-37-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned

30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

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Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

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Geiger, Troy A.

Harkness, Allen Ira

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Kilinc-Balci, F. Selcen

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Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 38-NFPA 1891-2020 [Section No. 3.3.21]

~~**3.3.26** Hazardous Materials and CBRN Protective Ensembles and Ensemble Elements.~~

~~Protective ensembles and ensemble elements designed to provide minimum full-body protection against exposure to hazardous chemicals or chemical/biological terrorism agents occurring during emergencies.~~

~~**3.3.26.1** Emergency Medical Protective Clothing.~~

~~Items of both single-use and multiple-use protective clothing that provide limited physical protection and barrier protection against body fluid-borne pathogen contact with the wearer's body during delivery of emergency patient care and other emergency medical functions.~~

~~**3.3.26.2** Liquid Splash–Protective Ensembles and Ensemble Elements.~~

~~**3.3.26.2.1** Liquid Splash–Protective Clothing.~~

~~Multiple items of compliant protective clothing and equipment products that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids.~~

~~**3.3.26.2.2** Liquid Splash–Protective Ensemble.~~

~~Multiple elements of compliant protective clothing and equipment products that when worn together provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids.~~

~~**3.3.26.2.3** Liquid Splash–Protective Footwear.~~

~~The element of the protective ensemble, or the item of protective clothing that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the feet, ankles, and lower legs.~~

~~**3.3.26.2.4** Liquid Splash–Protective Garment.~~

~~The element of the protective ensemble or the item of protective clothing that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the upper and lower torso, arms and legs, and possibly the head, hands, and feet.~~

~~**3.3.26.2.5** Liquid Splash–Protective Glove.~~

~~The element of the protective ensemble, or the item of protective that provide protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the hands and wrists.~~

~~**3.3.26.2.6** LiquidSplash–Protective Hood.~~

~~The element of the protective ensemble or an item of protective clothing that provides protection from some, but not all, risks of hazardous materials emergency incident operations involving liquids to the head and neck.~~

~~**3.3.26.3** Protective Ensembles to Hazardous Materials Emergencies and CBRN Incidents.~~

~~**3.3.26.3.1** Class 1 CBRN Protective Ensemble and Ensemble Elements.~~

~~A CBRN protective ensemble and ensemble elements designed to protect the user at incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).~~

~~**3.3.26.3.2** Class 2 CBRN Protective Ensemble and Ensemble Elements.~~

~~A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving vapor or liquid chemical hazards where the concentrations are at or above immediately dangerous to life and health (IDLH), requiring the use of self-contained breathing apparatus (SCBA).~~

~~**3.3.26.3.3** Class 3 CBRN Protective Ensemble and Ensemble Elements.~~

~~A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving low levels of vapor or liquid chemical hazards where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of CBRN air-purifying respirators (APR) or CBRN-powered air-purifying respirators (PAPR).~~

~~**3.3.26.3.4** Class 4 CBRN Protective Ensemble and Ensemble Elements.~~

~~A CBRN protective ensemble and ensemble elements designed to protect emergency first responder personnel at terrorism incidents involving biological hazards or radiological particulate hazards where the concentrations are below immediately dangerous to life and health (IDLH), permitting the use of air-purifying respirators (APR) or powered air-purifying respirators (PAPR).~~

~~**3.3.26.4** Vapor-Protective Ensembles for Hazardous Materials Emergencies and CBRN Incidents.~~

~~Multiple elements of compliant protective clothing and equipment that when worn together provide protection from some risks, but not all risks, of vapor, liquid-splash, and particulate environments during hazardous materials incidents and from chemical and biological terrorism agents in vapor, gas, liquid, or particulate form.~~

Submitter Information Verification

Committee: FAE-HAZ
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Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.

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Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 11-NFPA 1891-2020 [Section No. 3.3.23]

Global SR-6

3.3.29 Independent Service Provider (ISP).

An ~~AHJ~~independent third party performing services for inspection, cleaning, disinfection, sanitization, decontamination for reuse, and repair of hazmat/CBRN/EMO PPE.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Thu Oct 29 11:17:27 EDT 2020

Committee Statement

Committee Statement: Align the definition more closely with NFPA 1851.
Response Message: SR-11-NFPA 1891-2020

Ballot Results

This item has passed ballot

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
Greene, Russell R.
Wiseman, Darrell B

Affirmative All

Allen, Jason L.
Baxter, Christina M.
Beggs, Dale Gregory
Clifford, Brian J.
Dugan, Nicholas
Fithian, William A.
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Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 46-NFPA 1891-2020 [New Section after 3.3.26]

3.3.33* Multiple Use.

Items designed to be worn repeatedly and used for protection during emergency medical operations.

A.3.3.33 Multiple Use.

For PPE used in hazardous materials emergencies and CBRN terrorism incidents, certain items including ensembles and ensemble elements can be considered for multiple use by the AHJ. In NFPA 1999 , garments, footwear, face protection devices, cleaning/utility gloves, and work gloves can be certified as multiple-use items. The continued use of these items is subject to applying the care and use instructions provided by the manufacturer. While some multiple-use items are evaluated for performance after repeated laundering, these conditioning treatments do not indicate a specific wear life for the item. The AHJ is responsible for determining when any particular item should be retired based on its condition and expected performance in protecting the first responder or first receiver. Multiple use does not always mean multiple exposures; that must be determined by the AHJ in their review of manufacturer recommendations.

Submitter Information Verification

Committee: FAE-HAZ
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Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

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Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

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Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

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Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 12-NFPA 1891-2020 [Section No. 3.3.27]

3.3.34* Nonencapsulating Ensemble .

~~Protective ensemble or protective clothing~~ A type of ensemble that does not fully cover the wearer's respirator and relies on the facepiece of the respirator to interface with the garment to complete the enclosure of the wearer.

A.3.3.34 Nonencapsulating Ensemble.

Criteria are provided in NFPA 1992 –certified and NFPA 1994 –certified ensembles that permit the certification of either an encapsulating protective ensemble, which fully encloses the individual wearer and their respirator, or a nonencapsulating ensemble, where the respirator (primarily the full facepiece) completes the enclosure of the individual wearer in conjunction with garments, gloves, and footwear. Certification of nonencapsulating ensembles requires that the manufacturer specify each type of respirator. Each combination of a nonencapsulating ensemble and a respirator is evaluated for the relevant design and performance criteria of a relevant standard.

In addition, respirators are not evaluated to the chemical permeation or penetration resistance requirements that are applied to primary materials of nonencapsulating ensembles. Organizations specifying and using nonencapsulating ensembles should take into consideration the absence of these performance criteria where performing a hazard and risk assessment for determining the appropriate use of hazmat/CBRN protective ensembles.

Submitter Information Verification

Committee: FAE-HAZ
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Committee Statement

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Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

Kilinc-Balci, F. Selcen

Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

Monaco, Michael

Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 47-NFPA 1891-2020 [New Section after 3.3.29]

3.3.38* Respirator.

A certified device that provides respiratory protection for the wearer and is worn as part of an ensemble.

A.3.3.38 Respirator.

Respirators for hazardous materials and CBRN terrorism incidents can include, but are not be limited to, self-contained breathing apparatus (SCBA), supplied air respirators (SAR), air-purifying respirators (APR), and powered air-purifying respirators (PAPR).

Respirators for emergency medical operations include respirators approved by NIOSH as N95 filtering facepieces that further demonstrate fluid resistance as part of single-use emergency medical protective ensembles, and either of the following:

(1) A NIOSH-approved full facepiece air-purifying respirator (APR) with P100 filters

(2) A NIOSH-approved appropriate tight- or loose-fitting powered air-purifying respirator (PAPR) with a protection level of HE as part a of multiple-use emergency medical protective ensemble

The minimum type of respirator for an individual ensemble is specified by the respective standard to which the ensemble is certified.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:40:39 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

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Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

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Lakomiak, Paul S.

Lancaster, Beth C.

Lehtonen, Karen E.

Mann, Philip C.

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Newsom, Amanda H.

Nystrom, Ulf

O'Connor, James T.

Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 48-NFPA 1891-2020 [New Section after 3.3.31]

3.3.40* Ruggedized.

A category of ensembles with increased physical durability.

A.3.3.40 Ruggedized.

Specific criteria exist in NFPA 1994 that define Class 2, Class 3, and Class 4 ensembles as ruggedized.

Submitter Information Verification

Committee: FAE-HAZ

Submittal Date: Sat Nov 14 21:41:42 EST 2020

Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

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Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

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Salvato, Michael

Shelton, Robert E.

Shoaf, Richard C.

Stull, Jeffrey O.

Thompson, Donald B.

Vyas, Khyati

Wisner, Jr., John E.

Zeigler, James P.

Ziskin, Michael

Second Revision No. 39-NFPA 1891-2020 [Section No. 3.3.34]

3.3.43 Selection.

The process of determining what ~~hazardous materials and CBRN protective ensembles, ensemble elements, and clothing~~ hazmat/CBRN/EMO PPE ~~are~~ is necessary for protection of responders from an anticipated, specific hazard or other activity; the procurement of the appropriate ~~hazardous materials and CBRN protective ensembles, ensemble elements, and clothing~~ hazmat/CBRN/EMO PPE ; and the choice of ~~hazardous materials and CBRN protective ensembles, ensemble elements, and clothing~~ hazmat/CBRN/EMO PPE for a specific hazard or activity at an emergency incident.

Submitter Information Verification

Committee: FAE-HAZ
Submittal Date: Sat Nov 14 21:22:32 EST 2020

Committee Statement

Committee Statement: Definitions in the chapter were made to remove unused definitions and ensure that accessory information was moved to the annex.

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Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas
Green, Dustin
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Wiseman, Darrell B

Affirmative All

Allen, Jason L.
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Clifford, Brian J.

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Geiger, Troy A.
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Shoaf, Richard C.
Stull, Jeffrey O.
Thompson, Donald B.
Vyas, Khyati
Wisner, Jr., John E.
Zeigler, James P.
Ziskin, Michael

Second Revision No. 49-NFPA 1891-2020 [New Section after 3.3.35]

3.3.45* Single Use.

A designation applied to an ensemble or ensemble element indicating their one-time use followed by disposal.

A.3.3.45 Single Use.

In this standard, the designation of an ensemble or ensemble element as “single use only” is provided by the product manufacturer. A single use could include unpackaging, one donning, or one wearing while responding. In the absence of any manufacturer’s specific information, one “use” should be considered any wearing of the item. Inspection of any item should be conducted in accordance with the manufacturer’s instructions and NFPA 1891, and should include assessing the overall condition and suitability of an item for a specified use.

Submitter Information Verification

Committee: FAE-HAZ
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Committee Statement

Committee Statement: Added missing definitions to provide consistency with NFPA 1990 and NFPA 1999, but also provided consistency across the PPE project.

Response Message: SR-49-NFPA 1891-2020

Ballot Results

✔ **This item has passed ballot**

34 Eligible Voters
4 Not Returned
30 Affirmative All
0 Affirmative with Comments
0 Negative with Comments
0 Abstention

Not Returned

Del Re, Nicholas

Green, Dustin

Greene, Russell R.

Wiseman, Darrell B

Affirmative All

Allen, Jason L.

Baxter, Christina M.

Beggs, Dale Gregory

Clifford, Brian J.

Dugan, Nicholas

Fithian, William A.

Geiger, Troy A.

Harkness, Allen Ira

Hedstrom, Olaf

Hirschey, Ryan C.

Kennedy, Jeffrey

Kerbow, Kyle

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Lehtonen, Karen E.

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Wisner, Jr., John E.

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Ziskin, Michael