Tentative Interim Amendment

NFPA® 1999

Standard on Protective Clothing and Ensembles for Emergency Medical Operations
2013 Edition

Reference: Various Sections
TIA 13-1
(SC 15-4-13 / TIA Log #1169)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations*, 2013 edition. The TIA was processed by the Technical Committee on Emergency Medical Services Protective Clothing and Equipment and the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment, and was issued by the Standards Council on April 7, 2015, with an effective date of April 27, 2015.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise the title to read as follows:

New Title: Standard on Protective Clothing and Ensembles for Emergency Medical Operations

2. Add new sections to read as follows:

1.1.2 This standard shall also specify additional minimum design, performance, testing, documentation, and certification as requirements for single-use and multiple-use emergency medical protective ensembles comprising the protective clothing items described in 1.1.1 for protection from airborne and liquid-borne pathogens. *[renumber current 1.1.2 and successive paragraphs*]

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. [*renumber current 1.2.2 and successive paragraphs*]

3. Revise 1.3.1 and 1.3.4 to read as follows:

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; medical care facility footwear; and single-use and multiple-use emergency protective ensembles; and shall apply to ensembles and ensemble elements for the additional [C]BRN protection from specified biological and radiological terrorism agents.

1.3.4* Other than the certification of emergency medical protective ensembles to the single-use, multiple-use, and [C]BRN 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, and by OSHA in 29 CFR 1910.134 and 29 CFR 1910.1030.

4. Add new referenced publications to Section 2.2:

NFPA 1951, *Standard on Protective Ensembles for Technical Rescue Incidents*, 2013 edition.
NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2013 edition.
NFPA 1991, *Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies*, 2005 edition.
NFPA 1992, *Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies*, 2012 edition.
NFPA 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*, 2012 edition.

5. Add new referenced publication to 2.3.3:

ASTM E96, *Standard Test Methods for Water Vapor Transmission of Materials*, 2013.

6. Revise Section 3.3 General Definitions and associated Annex items to read as follows:

3.3.8 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.

3.3.23* 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.3.3.23 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.

3.3.28 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.

7. Add new definitions and associated Annex items to Section 3.3 as follows:

3.3.XX Elements(s). See 3.3.XX, Ensemble Elements.

3.3.XX Ensemble Elements. The compliant products that provide protection to the upper and lower torso, arms, legs, head, hands, and feet.

3.3.XX* 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.XX 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 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.

3.3.XX* 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.XX 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. 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.XX Storage Life. The life expectancy of protective clothing and ensemble elements from the date of manufacture when it is only stored and inspected and has undergone proper care and maintenance in accordance with the manufacturer's instructions, but not used, donned, doffed, or repaired.

8. In Table 4.4.1, change first row first column to read "Multiple-use emergency medical garments and ensembles", and first two instances of "Garment" in fourth column to "Garment or Ensemble"

9. In Table 4.4.1, change second row first column to read "Single-use emergency medical garments and ensembles", and first two instances of "Garment" in fourth column to "Garment or Ensemble"; change the ninth line in the second row second column from "Total Heat Loss Test (8.32)" to "Moisture Vapor Transmission Rate Test (8.28)".

10. In Table 4.4.1, delete ninth line starting "Glove Donning Test (8.28)" from fifth row.

11. Revise 5.1.2 and 5.1.2.2 to read as follows:

5.1.2 Single-Use Emergency Medical Protective Garment and Ensemble Product Label Requirements.

5.1.2.2 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 [*insert the term* **GARMENT** *or* **ENSEMBLE** *here*] **IS FOR SINGLE USE ONLY!**

THIS [*insert the term* **GARMENT** *or* **ENSEMBLE** *here*] **MEETS THE SINGLE-USE EMERGENCY MEDICAL** [*insert the term* **GARMENT** *or* **ENSEMBLE** *here*] **REQUIREMENTS OF NFPA 1999, *STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS,* 2013 EDITION.**
DO NOT REMOVE THIS LABEL!"

12. Add a new 5.1.2.4 as follows:

5.1.2.4 Where the garment is certified as part of a single-use emergency medical protective ensemble, the following additional language shall be provided:
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.]

13. Revise 5.1.3 to read as follows:

5.1.3 Multiple-Use Emergency Medical Protective Garment and Ensemble Product Label Requirements.

5.1.3.2 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 [*insert the term* **GARMENT** *or* **ENSEMBLE** *here*] **MEETS THE MULTIPLE-USE EMERGENCY MEDICAL** [*insert the term* **GARMENT** *or* **ENSEMBLE** *here*] **REQUIREMENTS OF NFPA 1999,** ***STANDARD ON PROTECTIVE CLOTHING AND ENSEMBLES FOR EMERGENCY MEDICAL OPERATIONS*****, 2013 EDITION.**

DO NOT REMOVE THIS LABEL!"

14. Add a new 5.1.3.6 as follows:

5.1.3.6 Where the garment is certified as part of a multiple-use emergency medical protective ensemble, the following additional language shall be provided:
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.]

15. Revise 5.2.2 to read as follows:

5.2.2 For protective ensembles, or protective ensembles certified to the [C]BRN requirements, the manufacturer shall provide the following additional instruction and information with each ensemble:
(1) A statement that only the ensemble and the specific items with which the ensemble has been certified shall be worn together to ensure that protection is provided.
(2) A list of the specific items and interface components that shall be worn as part of the ensemble, including each type of NIOSH APR, PAPR, SCBA, or approved breathing system(s) that the ensemble has been certified with.
(3) Specific limitations associated with the use of the ensemble for a response involving biological threats or [C]BRN hazards, including but not limited to a statement that protection against radiological and nuclear hazards is limited to particulates only.
(4) Specific care and maintenance provisions associated with properly maintaining the unique performance properties of the ensemble, its items, or interface components.
(5) A statement that, if the ensemble is used in an emergency involving biological or [C]BRN hazards, the ensemble shall be retired from use and not be further used.

16. Add a new 5.2.3, A.5.2.3 and 5.2.4 as follows:

5.2.3* For single-use or multiple-use protective ensembles, the following additional instructions and information shall be provided:
(1) The specific sequence and requirements for donning each item of the ensemble.
(2) The specific type of tape and detailed instructions for its application if specified for single-use protective ensembles only.
(3) Specific recommended methods for cleaning each element where elements are combined or attached.
(4) Specific considerations for decontamination to be employed during the doffing of ensemble elements.
(5) 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.5.2.3 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.

5.2.4 The manufacturer shall state the storage life for all single-use and multiple-use protective elements that have been certified as part of an ensemble, and shall include the storage life and the basis for recommended storage life as part of the user information.

17. Add a new section 6.1.1.8 and associated Annex items as follows:

6.1.1.8* Where the garment is certified as part of a single-use emergency medical protective ensemble to meet the requirements of Section 7.1.1.1, the manufacturer shall specify the use of any NFPA 1999-certified single-use emergency medical examination gloves (2 pairs – inner and outer), specific emergency medical footwear or emergency medical footwear covers, specific eye and face protection devices, and specific filtering facepiece respirator.

6.1.1.8.1 Emergency medical protective footwear shall be permitted to include any footwear certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, or NFPA 1994.

6.1.1.8.2 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.

6.1.1.8.3* Eye and face protection devices shall be permitted to include goggles and faceshields that only meet ANSI Z87.1 requirements when marked for splash/droplet use.

6.1.1.8.4* The filtering facepiece respirator shall be a NIOSH-approved filtering facepieces in accordance with Title 42, Code of Federal Regulations, Part 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.

6.1.1.8.5 The manufacturer shall be permitted to specify respirators that meet the requirements in 6.1.2.9.2.

6.1.1.8.6* The use of a specific tape specified by the manufacturer shall be permitted for securing items in interface areas.

A.6.1.1.8 See A.3.3.XX, Single-Use Emergency Medical Protective Ensemble.

A.6.1.1.8.3 Multiple-use emergency medical eye and face protective devices are already required to meet the respective requirements of ANSI Z87.1, *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.

A.6.1.1.8.4 ASTM F2100, *Standard Specification for Performance of Materials Used in Medical Face Masks*, addresses performance including bacterial filtration efficiency, differential pressure, sub-micron 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, Code of Federal Regulations, 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, Code of Federal Regulations, Subpart E, Section 878.4040, "Surgical Devices." Surgical N95 respirators are listed by NIOSH at http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource3healthcare.html#e.

A.6.1.1.8.6 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.

18. Add a new section 6.1.2.9 and associated Annex item as follows:

6.1.2.9* Where the garment is certified as part of a multiple-use emergency medical protective ensemble to meet the requirements of Section 7.1.2.1, the manufacturer shall specify the use of specific emergency medical cleaning/utility or work gloves worn over any NFPA 1999-certified single-use medical emergency examination gloves, specific multiple-use emergency medical footwear, and specific full facepiece respirator(s).

6.1.2.9.1 Emergency medical protective footwear shall be permitted to include any footwear certified to NFPA 1951, NFPA 1971, NFPA 1991, NFPA 1992, or NFPA 1994.

6.1.2.9.2 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.

6.1.2.9.3 Full face respirators shall be NIOSH approved as either 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 Title 42, Code of Federal Regulations, Part 84, "Approval of Respiratory Protective Devices."

6.1.2.9.4 Where a loose fitting powered air-purifying respirator is specified, the materials used in the construction of the hood shall meet the garment material performance requirements specified in either 7.1.1.1 with the exception of the requirement in 7.1.1.8, or 7.1.1.2 with the exception of 7.1.2.9.

A.6.1.2.9 See A.3.3.XX, Multiple-Use Emergency Medical Protective Ensemble.

19. Revise 6.2.3.6 to read as follows:

6.2.3.6 In order to label or otherwise represent a glove as compliant with the requirements of this standard, the manufacturer shall provide gloves in not less than five separate and distinct sizes.

20. Move asterisk from 6.2.3.6 to paragraph 6.2.3.7.

21. Revise 6.3.3.3 through 6.3.3.5 to read as follows:

6.3.3.3 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 Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices*.

6.3.3.4 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 Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices*.

6.3.3.5 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 Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices*.

22. Revise 7.1.1.1 and 7.1.1.8 to read as follows:

7.1.1.1 Full body or full torso garments, including, but not limited to, ensembles, coveralls, coats, jackets, pants, and overalls, shall be tested for liquidtight integrity as specified in Section 8.2, Liquidtight Integrity Test One, and shall allow no water penetration.

7.1.1.8 Garment materials for full body garments including, but not limited to, ensembles, coveralls, and full torso and limb encapsulating garments shall be tested for moisture vapor transmission rate as specified in Section 8.28, Moisture Vapor Transmission Rate Test, and shall have a moisture vapor transmission rate of 650 g/m^2-24 hr or greater.

23. Revise 7.1.2.1 to read as follows:

7.1.2.1 Garments or ensembles shall be tested for liquidtight integrity as specified in Section 8.2, Liquidtight Integrity Test One, and shall allow no water penetration.

24. Revise 7.2.1.6 to read as follows:

7.2.1.6 Examination gloves shall be tested for dexterity as specified in Section 8.14, Dexterity Test One, and shall have test times no greater than 120 percent of baseline test measurements.

24. Revise 7.2.2.4 and 7.2.2.5 to read as follows:

7.2.2.4 Cleaning/utility glove materials shall be tested for tensile strength as specified in Section 8.11, Ultimate Tensile Strength Test, and shall have an ultimate tensile strength of greater than 10.3 MPa (1500 psi).

7.2.2.5 Cleaning/utility glove materials shall be tested for puncture resistance as specified in Section 8.13, Puncture Resistance Test One, and shall have a puncture resistance of greater than 9 N (2 lbf).

25. Revise 7.2.3 to read as follows:

7.2.3.3 Work glove body materials shall be tested for puncture resistance as specified in Section 8.13, Puncture Resistance Test One, and shall have a puncture resistance of greater than 9 N (2 lbf).

7.2.3.6 Gloves shall be tested for hand function as specified in Section 8.26, Dexterity Test Two, and shall have an average percent of barehanded control not exceeding 200 percent.

26. Revise 7.4.2.3 to read as follows:

7.4.2.3 Footwear soles and heels shall be tested for abrasion resistance as specified in Section 8.19, Abrasion Resistance Test One, and the relative volume loss shall not be greater than 250 mm^3.

27. Revise 7.4.3.3 to read as follows:

7.4.3.3 Footwear soles and heels shall be tested for abrasion resistance as specified in Section 8.19, Abrasion Resistance Test One, and the relative volume loss shall not be greater than 250 mm^3.

28. Revise 8.1.3.7 and 8.1.3.12 to read as follows:

8.1.3.7 Garments shall be washed and dried for a total of 10 washing and 10 drying cycles.

8.1.3.12 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 8.1.3.11.

29. Delete 8.1.4.

30. Add a new 8.2.2.3 as follows:

8.2.2.3 When ensembles are tested, specimens shall include all items that are specified as part of the ensemble in 6.1.1.8 or 6.1.2.9.

31. Revise 8.2.3 to read as follows:

8.2.3.1 Samples for conditioning shall be complete garments or ensembles.

8.2.3.2 Single-use garment and ensemble samples shall be conditioned as specified in 8.1.2.

8.2.3.3 Multiple-use garment and ensemble samples shall be conditioned as specified in 8.1.3 and then conditioned as specified in 8.1.2. All other ensemble elements shall be conditioned as specified in 8.1.2.

32. Revise 8.2.4.2 to read as follows:

8.2.4.2 In the testing of garments, the mannequin used in testing shall have straight arms and legs, with the arms positioned downward at the mannequin's side.

33. Add a new 8.2.4.3 as follows:

8.2.4.3 In the testing of ensembles, the mannequin used in testing shall have straight legs, means for supporting gloves as intended to be worn, a straight right arm positioned downward at the mannequin's side, and a bent left arm, with the left arm bent upward at a 135-degree angle at the elbow from the mannequin's side.

34. Add a new 8.2.5.4 as follows:

8.2.5.4 The use of tape shall be permitted when testing single-use ensembles. The tape shall be applied using the instructions supplied by the manufacturer as required in 5.2.3(2).

35. Renumber old 8.2.5.4 as 8.2.5.5 and revise as follows:

8.2.5.5 For single-use garments and ensembles, the suited mannequin shall be exposed to the liquid spray for a total of 2 minutes —30 seconds in each of the four specified mannequin orientations. For multiple-use garments and ensembles, the suited mannequin shall be tested for a total of 8 minutes with 2 minutes in each of the four specified mannequin orientations.

36. Renumber old 8.2.5.5 and 8.2.5.6 as follows:

8.2.5.6 At the end of the liquid spray exposure period, excess liquid shall be removed from the surface of the specimen.

8.2.5.7 Inspection of the liquid-absorptive garment on the mannequin shall be completed within 10 minutes of the end of the liquid spray exposure period.

37. Revise 8.10.3.2 to read as follows:

8.10.3.2 Specimens shall be conditioned as specified in 8.1.2.

38. Revise 8.13.4 to read as follows:

8.13.4.1 Specimens shall be tested in accordance with ASTM F1342, *Standard Test Method for Protective Clothing Material Resistance to Puncture*, using Test Method A with the following modification:

(1) 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.

39. Revise 8.18.8.3 to read as follows:

8.18.8.3 Cut resistance testing shall be performed under a load of 75 g (2.5 oz).

40. Delete current Section 8.24.1 through 8.24.7 and replace with:

8.24 Chemical Permeation Resistance Test.

8.24.1 Application. This test method shall apply to cleaning/utility glove materials.

8.24.2 Specimens. A minimum of three specimens shall be tested.

8.24.3 Sample Preparation. Specimens shall be conditioned as specified in 8.1.2.

8.24.4 Procedure.

8.24.4.1 Permeation resistance shall be measured in accordance with ASTM F739a, *Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact*, at 25°C, ±2°C (77°F, ±3°F), using the following test parameters and modifications:
(1) A test duration of 1 hour shall be used.
(2) The test shall be done in the closed loop configuration, using distilled water as the collection medium.
(3) The selected method of detection shall have a sensitivity for measuring a cumulative permeation of 0.1 $\mu g/cm^2$ over the 1-hour test period. The actual sensitivity of the selected method of detection shall be determined.
(4) The total cumulative permeation over 1 hour shall be measured in lieu of breakthrough time and permeation rate.

8.24.4.2 Permeation resistance shall be separately evaluated against the following chemicals:
(1) 40 percent weight-for-weight (w/w) solution of glutaraldehyde
(2) 70 percent w/w isopropanol
(3) 5 percent solution of sodium hypochlorite

41. Renumber current 8.24.8 and 8.24.9 as 8.24.5 and 8.24.6, respectively.

42. Revise 8.25.8.1 to read as follows:

8.25.8.1 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 8.1.9 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.

43. Delete section 8.28 in its entirety and replace with the test method below:

8.28 Moisture Vapor Transmission Rate Test.

8.28.1 Application. This test method shall apply to the single-use protective garment materials or composites.

8.28.2 Specimens.

8.28.2.1 Moisture vapor transmission rate testing shall be conducted on at least three specimens.

8.28.2.2 Specimens shall consist of all layers in the protective garment composite arranged in the order and orientation as worn.

8.28.2.3 Specimen composite shall consist only of base composite layers required to meet the specifications of this standard. Specimens shall not include layers added for reinforcement, or externally added materials for visibility or identification.

8.28.3 Sample Preparation.

8.28.3.1 Samples for conditioning shall be at least a 1-m (1-yd) square of each material.

8.28.3.2 Specimens to be tested shall be conditioned as specified in 8.1.2.

8.28.4 Apparatus. The test apparatus shall be as specified in ASTM E96, *Standard Test Methods for Water Vapor Transmission of Materials*.

8.28.5 Procedure. Testing shall be conducted in accordance with ASTM E96, *Standard Test Methods for Water Vapor Transmission of Materials*, with the following modifications:
(1) The specimen shall be placed on the test plate with the side normally facing the human body toward the test plate.
(2) For multiple layers, the layers shall be arranged in the order and orientation as worn.

(3) Procedure B, Water Method at 23°C (73.4°F), as specified in X1.1.2 of ASTM E96, *Standard Test Methods for Water Vapor Transmission of Materials*, shall be used.

8.28.6 Report. The individual and average moisture vapor transmission rate of all specimens shall be recorded and reported.

8.28.7 Interpretation. Pass/fail determination shall be based on the average reported moisture vapor transmission rate of all specimens tested.

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