NFPA 1971

Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

2007 Edition

Reference: 7.20.1.3, 8.67.4.1, 8.67.5, 8.67.6, and A.8.67.1(3)
TIA 07-4
(SC 08-3-3/TIA Log #899)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2007 edition. The TIA was processed by the Technical Committee on Structural and Proximity Fire Fighting Protective Clothing and Equipment, and was issued by the Standards Council on March 4, 2008, with an effective date of March 24, 2008.

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 proposal 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. Make the following changes in Chapter 7, Performance Requirements to read:

7.20.1.3 Each ensemble element's CBRN barrier layer and the CBRN barrier layer seams shall be tested for permeation resistance as specified in Section 8.67, Chemical Permeation Resistance Test, and shall meet the following performance criteria:

(1) For permeation testing of chemical warfare agent Distilled Mustard (HD), the average cumulative permeation in 1 hour shall not exceed 4.0 $\mu g/cm^2$.

(2) For permeation testing of chemical warfare agent Soman (GD), the average cumulative permeation in 1 hour shall not exceed 1.25 $\mu g/cm^2$.

(3) For permeation testing of liquid and gaseous toxic industrial chemicals, ~~the average breakthrough time shall not be less than 60 minutes~~ the average cumulative permeation in 1 hour shall not exceed 6.0 $\mu g/cm^2$.

2. Modify permeation test procedures for measurement of cumulative permeation for liquid chemical warfare agents and liquid and gaseous toxic industrial chemicals to read:

8.67.4.1 Specimens shall be tested for permeation resistance for ~~not less than~~ 60 minutes, +1 minute, -0 minute against the chemicals specified in 8.67.4.2, 8.67.4.3 and 8.67.4.4 in accordance with ASTM F 739, *Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact*, with the following modifications:

Note to reviewers: Reference to 8.67.4.4 was added by TIA 07-3

(1) The test cells shall be designed to accommodate the introduction of liquid chemicals in a safe manner.

~~(2) The testing mode shall be in an open loop configuration for the collection of permeant.~~

~~(3) The collection media shall be filtered air flowed through the bottom of the test cell at a rate of 1 Lpm, ±0.1 Lpm, with a relative humidity of 80 percent, ±5 percent.~~

~~(4) Analytical methods used shall be sensitive to the permeant at concentrations of at least one order of magnitude lower than the required end points.~~

~~(5) Where cumulative permeation end points are not specified in this standard, a permeation rate of 0.1 $\mu g/cm^2$/min, as defined by ASTM F 739, *Standard Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact*, shall be used.~~

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(2) The testing mode shall be open loop and the collection media shall be filtered air at a temperature of 32°C ±3°C (90°F ±5°F) and a relative humidity of 80 percent ±5 percent, flowed through the collection chamber of the test cell at a rate of 1 Lpm ±0.1 Lpm.

(3)* A means shall be used to determine the total amount of permeating chemical over a 60-minute period following initial contact of the material with the challenge chemical.

(4) The cumulative permeation in micrograms per square centimeter at 60 minutes, +1 minute, -0 minute of chemical exposure shall be determined.

(5) The selected method of detection shall have a sensitivity that is at least one order of magnitude less than the specified end point for the respective chemical over the 60-minute test period. The actual sensitivity of the selected method of detection shall be determined.

8.67.5 Report.

8.67.5.1 ~~For the permeation testing of chemical warfare agents, t~~The cumulative permeation in 1 hour shall be recorded and reported in micrograms per square centimeter ($\mu g/cm^2$) for each specimen. ~~The average cumulative permeation in 1 hour for all specimens shall be calculated, recorded, and reported. The report shall include the pass or fail results for each chemical tested.~~

~~**8.67.5.2** For permeation testing of liquid and gaseous toxic industrial chemicals, the normalized breakthrough time shall be record and reported in minutes for each specimen. The average normalized breakthrough time shall also be calculated, recorded, and reported.~~

8.67.5.2 If no challenge chemical is detected at the end of the 1-hour test period, the cumulative permeation shall be reported as less than the minimum detectable mass per unit area for the specific chemical being tested.

8.67.5.3 The average cumulative permeation shall be calculated and reported for all specimens.

8.67.5.3.1 If no challenge chemical is detected for one or two specimens, the average cumulative permeation shall be the average of all specimens where cumulative permeation is measured and the minimum detectable cumulative permeation for those specimens where no challenge chemical is detected.

8.67.5.3.2 If no challenge chemical is detected in all of the specimens tested, the average cumulative permeation shall be reported as less than the minimum detectable mass per unit area for the specific chemical being tested.

8.67.5.4 The report shall include the pass or fail results for each chemical tested.

8.67.6 Interpretation.

~~**8.67.6.1**~~ For permeation testing of chemical warfare agents specified in 8.67.4.2(1) and liquid and gaseous industrial chemicals specified in 8.67.4.2(2), 8.67.4.3 and 8.67.4.4, the average cumulative permeation shall be used to determine pass or fail performance.

~~**8.67.6.2** For permeation testing of liquid and gaseous industrial chemicals specified in 8.67.4(2), the average normalized breakthrough time shall be used to determine pass or fail performance.~~

Note to reviewers: References to 8.67.4.3 and 8.67.4.4 were added to 8.67.6.2 by TIA 07-3. As 8.67.6.2 is being combined with 8.67.6.1, those references need to be carried forward.

3. Add new annex to read:

A.8.67.4.1(3) One method of determining the total amount of permeating chemical is to flow the conditioned collection medium through an appropriate filter or sorbent that captures the chemical. Following the 60-minute exposure period of the protective clothing material specimen (for each challenge chemical), the filter or sorbent can then be removed, and the collected challenge chemical extracted for analysis using an extract chemical and analytical technique that is specific to the challenge chemical.

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist)

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