Tentative Interim Amendment

NFPA 1994

Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents

2007 Edition

Reference: 8.7
TIA 07-3
(SC 07-10-10/TIA Log #892)

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 1994, *Standard on Protective Ensembles for First Responders to CBRN Terrorism Incidents*, 2007 edition. The TIA was processed by the Technical Committee on Hazardous Materials Protective Clothing and Equipment, and was issued by the Standards Council on October 4, 2007, with an effective date of October 24, 2007.

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 the Chapter 8.7 Permeation Test Method

8.7.4.1 Specimens shall be tested for permeation resistance for not less than 60 minutes against the chemicals specified in 8.7.4.2, ~~and~~ 8.7.4.3, and 8.7.4.4 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:

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

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

(4) Where cumulative permeation end points are not specified in this standard, a permeation rate of 0.1 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.

8.7.4.2* The following non-volatile liquid chemicals shall be tested:

(1) ~~Liquid c~~Chemical warfare agents

(a) Distilled sulfur mustard [HD; bis (2-chloroethyl) sulfide] 505-60-2; at 32°C ±1°C (90°F ±2°F)

(b) Soman (GD; o-pinacolyl methylphosphonofluoridate), 96-64-0; at 32°C ±1°C (90°F ±2°F)

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(2) ~~Liquid t~~Toxic industrial chemicals~~:~~

~~(a) Acrolein (allyl aldehyde), 107-02-8; at 32°C ±1°C (90°F ±2°F)~~

~~(b) Acrylonitrile (VCN, cyanoethylene), 107-13-1; at 32°C ±1°C (90°F ±2°F)~~

~~(c)~~ (a) Dimethyl sulfate (DMS, sulfuric acid dimethyl ester), 77-78-1; at 32°C ±1°C (90°F ±2°F)

8.7.4.3* The following volatile liquid chemicals shall be tested:

(1) Acrolein (allyl aldehyde), 107-02-8; at 32°C ±1°C (90°F ±2°F)

(2) Acrylonitrile (VCN, cyanoethylene), 107-13-1; at 32°C ±1°C (90°F ±2°F)

8.7.4.~~3~~ 4 The following gases shall be tested:

(1) Ammonia (7664-41-7); at 32°C ±1°C (90°F ±2°F)

(2) Chlorine (Cl_2; 7782-50-5); at 32°C ±1°C (90°F ±2°F)

8.7.4.~~4~~ 5 Class 2 Elements.

8.7.4.~~4.1~~ 5.1 For Class 2 elements, the ~~gas~~ concentration for gases and volatile liquid chemicals shall be 350 ppm +35 ppm/−0 ppm.

8.7.4.~~4.2~~ 5.2 For Class 2 elements, the ~~liquid~~ concentration density for non-volatile liquid chemicals shall be 10 g/m^2 +1 g/m^2/−0 g/m^2.

8.7.4.~~4.3~~ 5.3* The liquid drops shall be applied as nominal 1 l drops uniformly distributed over the test area of the specimen surface. Where a seam, closure, or fixture is included, at least one drop shall be applied to each critical juncture, such as the seam edge.

8.7.4.~~4.4~~ 5.4 The test cell shall be assembled in the closed-top configuration.

8.7.4.~~5~~ 6 Class 3 Elements.

8.7.4.~~5.1~~ 6.1 For Class 3 elements, the ~~gas~~ concentration for gases and volatile liquid chemicals shall be 40 ppm +10 ppm/−0 ppm, and the cell shall be assembled in closed-top configuration.

8.7.4.~~5.2~~ 6.2 For Class 3 elements, the ~~liquid~~ concentration density for non-volatile liquid chemicals shall be 10 g/m^2 +1 g/m^2/−0 g/m^2.

8.7.4.~~5.3~~ 6.3 Drops shall be applied as nominal 1 l drops uniformly distributed over the test area of the specimen surface. Where a seam, closure, or fixture is included, at least one drop shall be applied to each critical juncture, such as the seam edge.

8.7.4.~~5.4~~ 6.4 For the non-volatile liquid chemicals specified in 8.7.4.2, the test cell shall be assembled in the open-top configuration with 0.3 Lpm ±0.03 Lpm of filtered air controlled at 80 percent ±5 percent, relative humidity (RH) flowing through the top of the cell. With the open-top configuration, the test cell washer shall be allowed to be sealed by an impermeable nonreactive sealant.

2. Add new appendix section:

A.8.7.4.2 Liquid chemicals are classified as non-volatile when their vapor-pressure at room temperature (20-25°C) is 5 mm Hg or less. This distinction between volatile and non-volatile is established in NFPA 1992, *Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials*, for specifying liquid chemical hazards. Upon release, volatile liquids quickly evaporate and the principal exposure to first responders is the chemical in a vapor form. This distinction is used for determining how protective clothing materials are tested for permeation resistance against liquid chemicals.

A.8.7.4.3 (see A.8.7.4.2)

3. Modifications to TIA Language.
Editorial Note: The following edits to 8.7.5.1 and 8.7.6 which were revised by TIA 07-2, are necessary to conform with this TIA.

8.7.5.1 For permeation testing of chemical warfare agents specified in 8.7.4.2(1) and liquid and gaseous industrial chemicals specified in 8.7.4.2(2), ~~and~~ 8.7.4.3, and 8.7.4.4, the cumulative permeation in 50 minutes shall be recorded and reported in µg/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.

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8.7.6 Interpretation. For permeation testing of chemical warfare agents specified in 8.7.4.2(1) and liquid and gaseous industrial chemicals specified in 8.7.4.2(2), 8 ~~and~~ 8.7.4.3, and 8.7.4.4, the average cumulative permeation shall be used to determine pass or fail performance.

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