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MEMORANDUM

TO: Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment

FROM: Yvonne Smith, *Committee Administrator*

DATE: August 16, 2022

SUBJECT: NFPA 1990 Proposed TIA No. 1665 **PRELIMINARY CC BALLOT RESULTS**

According to 5.6(b) in the NFPA *Regs*, the preliminary results show this TIA **HAS** achieved the $\frac{3}{4}$ majority vote.

27 **Eligible to Vote**
8 **Not Returned** (*Area, Fargo, Farley, Johnston, Legendre, McKenna, Morris, Szalajda*)

19 **Agree**
0 **Disagree**
0 **Abstain**

There are two criteria necessary to pass ballot [(1) simple majority (2) affirmative $\frac{3}{4}$ vote] in order to recommend that the Standards Council issue this TIA.

- (1) In all cases, an affirmative vote of at least a simple majority of the total membership eligible to vote is required.

$$[27 \text{ eligible} \div 2 = 13.5 = \mathbf{(14)}]$$

- (2) The number of affirmative votes needed to satisfy the $\frac{3}{4}$ requirement is 15.
(27 eligible to vote - 8 not returned - 0 abstentions = $19 \times 0.75 = 14.25$)

This proposed TIA has been published for public comment in the July/August 2022 issue of *NFPA News* with a Public Comment Closing Date of August 30, 2022. Any public comments received will be circulated to the committee. The Standards Council will consider the issuance of this TIA.

NFPA 1990-2022 Edition

Standard for Protective Ensembles for Hazardous Materials and CBRN Operations

TIA Log No.: 1665

Reference: 8.3.1.3 through 8.3.1.3.6

Comment Closing Date: August 30, 2022

Submitter: Jeffrey Stull, International Personnel Protection, Inc.

www.nfpa.org/1990

1. Revise Section 8.3.1.3 to read as follows:

8.3.1.3 Low Vapor Chemical Permeation Test.

...

8.3.1.3.3 Specimens.

8.3.1.3.3.1 For Procedure A, 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 For Procedure B, specimens shall be of a size required to fit the permeation test cell.

8.3.1.3.3.3 A minimum of three specimens shall be tested.

8.3.1.3.4 Apparatus.

8.3.1.3.4.1 Procedure A.

(A) The test apparatus and related equipment specified in TOP 08-2-503, *Low Volatility Agent Permeation (LVAP) Swatch Testing*, shall be used.

8.3.1.3.4.2(B) 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(C) 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(C).
- (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 cm² region.
- (3) A sorbent material suitable for the test chemical that has a minimum detection mass capability of 6.0 µg/cm².

- (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.).

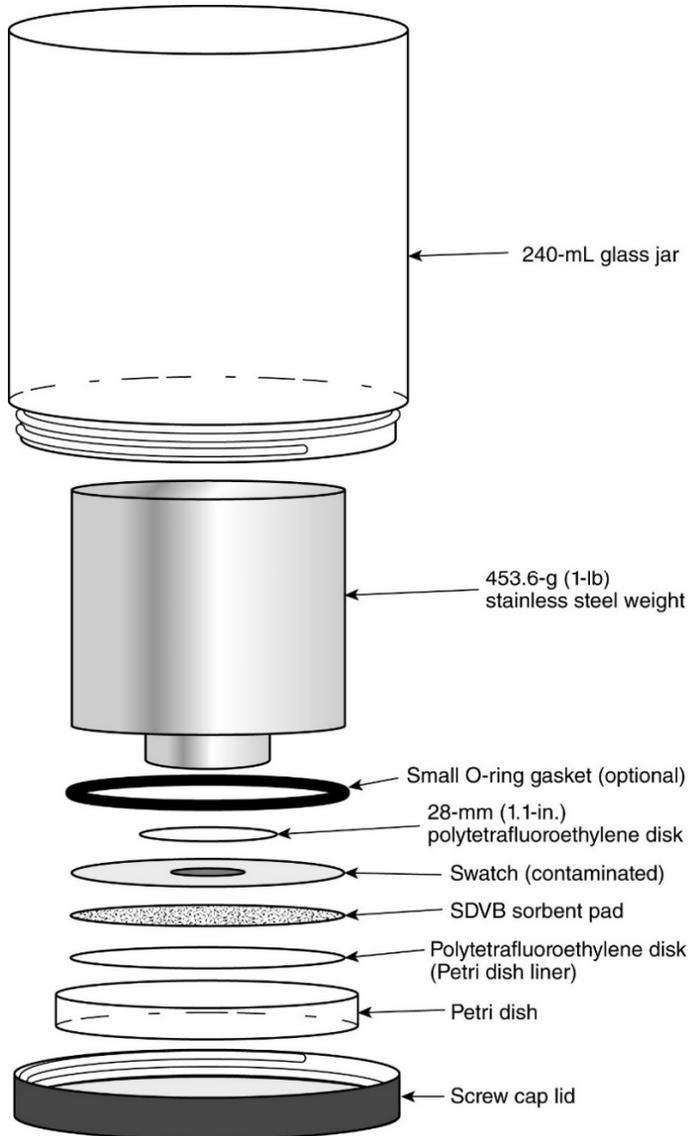


Figure 8.3.1.3.4.31(C) Diagram of Test Apparatus for Low Vapor Pressure Permeation Testing.

8.3.1.3.4.2 Procedure B. The test cell shall be the two-chambered test cell specified in 8.3.1.2.4.2 with the following modifications:

- (1) The male connector and male run tee on the lower body shall be outfitted with L-shaped tubes that allow for the introduction of deionized water as the collection medium.
- (2)* The modified test cell lower body tubes shall be of height and volume to maintain contact of the liquid collection medium against the exposure side of the specimen and include values to prevent release of the liquid collection medium.

A.8.3.1.3.4.2(2) Figure A.8.3.1.3.4.2(2) shows an example means of configuring the test cell for liquid collection.



Figure A.8.3.1.3.4.2(2) Example Configuration of Test Cell for Using a Liquid Collection Medium.

8.3.1.3.5 Procedures.

8.3.1.3.5.1 Either Procedure A or Procedure B shall be used.

8.3.1.3.5.2 Procedure A. Specimens shall be tested as specified in TOP 08-2-503, *Low Volatility Agent Permeation (LVAP) Swatch Testing*, 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 $6.0 \mu\text{g}/\text{cm}^2$.
- (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.

8.3.1.3.5.3 Procedure B. Specimens shall be tested as specified in 8.3.1.2.4.2 against sulfuric acid, 93.1 percent w/w (aqueous) using the procedures for liquid toxic industrial chemicals with the following modifications:

- (1) Deionized water shall be used as the collection medium in lieu of air. A volume of the liquid collection medium shall be put into the lower body of the test cell to maintain liquid collection medium contact with the challenge side of the specimen.
- (2) A collection period of only one hour shall be used.
- (3) At end of the collection period, the liquid collection medium shall be analyzed for sulfuric acid to provide a suitable level of detection for sulfuric acid or its constituent ions.

8.3.1.3.6 Report. 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) An indication of whether Procedure A or Procedure B was used.
- ~~(9)~~(10) Results for the negative and positive controls.
- ~~(40)~~(11) The mass of the chemical collected in μg for each specimen (Procedure A).
- (12) The concentration of chemical indicated in the liquid collection medium at the end of the test period (Procedure B).
- ~~(41)~~(13) The calculated individual and average cumulative permeation for each specimen in $\mu\text{g}/\text{cm}^2$.
- ~~(42)~~(14) The test duration.
- ~~(43)~~(15) The test temperature and RH for all the environmental control fixtures during preconditioning and test execution.

Substantiation: There are current uncertainties in the ability to apply the Low Vapor Chemical Permeation (LVAP) Test (Section 8.3.1.3) for the measurement of sulfuric acid permeation on NFPA 1994 Class 1 materials. While it appears that it may be possible to work out certain details for the implementation of this new test method, an alternative test method is proposed that uses a different approach that has been demonstrated as capable of measuring sulfuric acid permeation resistance, which would be based on the same criteria. The test method has historically been used for evaluating the permeation resistance of industrial inorganic and water soluble chemicals and is well documents. The proposed modifications of the LVAP Test permit the choice of the existing method or the other method where adaptations has been made for test cell used in the alternative method to be used for this application.

Emergency Nature: The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification for the action.

The introduction of the LVAP test method as part of NFPA 1990-2022, although initially verified, has resulted in potential problems that lead to uncertainty in the test results representing the intended performance. The consequence of this uncertainty is that certification test laboratories may not be to verify the existing LVAP test sufficient to be used as part of certification and therefore not enable certain products to be certified to NFPA 1994 requirements where this test method is currently required.

I AGREE there are no CORRELATION ISSUES in accordance with 3.4.2 and 3.4.3 of the NFPA Regs.

Eligible to Vote: 27

Not Returned : 8

Cristine Z. Fargo,Jeff Legendre,Michael F.

McKenna,Jonathan V. Szalajda,John H. Morris,James

B. Area,Edmund Farley,Ronald Johnston

Vote Selection

Agree

Votes Comments

19

Jason L. Allen

Agree

Amanda H. Newsom

Agree

Karen E. Lehtonen

Agree

Joseph Arrington

agree

Roger L. Barker

Agree

Diane B. Hess

agree F

David G. Matthews

Agree

Bruce H. Varner

Agree

Beth C. Lancaster

Agree.

Stephen R. Sanders

Agree

Harry P. Winer

Agree

Jeffrey O. Stull

Agree

William A. Van Lent

Agree

Thomas M. Hosea

agree

Robert D. Tutterow, Jr.

Agree

Rick L. Swan

Agree

Marco Tekelenburg

Agree

Douglas Menard

Agree

Dick Weise

Agree

Disagree

0

Abstain

0