



Standard Test Method for Man-In-Simulant Test (MIST) for Protective Ensembles¹

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1. Scope

1.1 This test method specifies the test equipment and procedures for conducting tests to estimate the entry of chemical agent vapor simulant through protective ensembles while worn by test subjects.

1.2 This test method permits the evaluation of protective ensembles consisting of protective garments or suits, gloves, footwear, respirators, and interface devices.

1.3 The results of this test method yield local physiological protective dosage factors at individual locations of the human body as well as a systemic physiological protective dosage factor for the entire ensemble.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- [E171 Practice for Conditioning and Testing Flexible Barrier Packaging](#)
- [F1052 Test Method for Pressure Testing Vapor Protective Suits](#)
- [F1154 Practices for Qualitatively Evaluating the Comfort, Fit, Function, and Durability of Protective Ensembles and Ensemble Components](#)
- [F1359 Test Method for Liquid Penetration Resistance of Protective Clothing or Protective Ensembles Under a Shower Spray While on a Mannequin](#)
- [F1494 Terminology Relating to Protective Clothing](#)
- [F1731 Practice for Body Measurements and Sizing of Fire and Rescue Services Uniforms and Other Thermal Hazard Protective Clothing](#)

¹ This test method is under the jurisdiction of ASTM Committee F23 on Personal Protective Clothing and Equipment and is the direct responsibility of Subcommittee F23.30 on Chemicals.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

2.2 National Fire Protection Association (NFPA) Standards:³

- [NFPA 1971 Standard on Protective Ensembles for Structural and Proximity Fire Fighting](#)
- [NFPA 1994 Standard on Protective Ensembles for CBRN Terrorism Incidents](#)

2.3 U.S. Military Publication:

- [Test Operations Procedure \(TOP 10-2-022\) Man-In-Simulant Test \(MIST\)—Chemical Vapor Testing of Chemical/Biological Protective Suits, September 2001.](#)⁴

3. Terminology

3.1 Definitions:

3.1.1 *chemical agent vapor simulant, n*—a substance used to replicate vapor characteristics of a chemical agent which is a more toxic substance.

3.1.1.1 *Discussion*—In this test method, methyl salicylate is used as a chemical agent vapor simulant for the blister agent, distilled mustard.

3.1.2 *chemical terrorism agent, n*—a liquid, solid, gaseous, or vapor chemical warfare agent or a toxic industrial chemical used to inflict lethal or incapacitating casualties, generally on a civilian population as a result of a terrorist attack.

3.1.3 *interface area, n*—a location on the body where two or more protective clothing items (for example, suits, garments, hoods, gloves, footwear, respirators, or other items) come into contact.

3.1.3.1 *Discussion*—Interfaces are potential breaches that could allow entry of chemicals into the interior of the protective ensemble.

3.1.4 *interface device, n*—an item of the ensemble that is intended to provide protection to the interface area.

3.1.5 *local physiological protective dosage factor (PPDF_i), n*—a physiological protective dosage factor at a specific location on the body.

3.1.5.1 *Discussion*—In this test method, local physiological protective dosage factors are measured at 30 different locations on the body.

³ Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

⁴ U.S. Army Developmental Test Command (DTC), ATTN: CSTE-DTC-TT-S, Aberdeen Proving Ground, MD 21005-5055.