



Standard Test Method for Permeation of Liquids and Gases through Protective Clothing Materials under Conditions of Continuous Contact¹

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^{ε1} NOTE—Editorially corrected 8.8.1 in February 2015.

INTRODUCTION

Workers involved in the production, use, and transportation of liquid and gaseous chemicals can be exposed to numerous compounds capable of causing harm upon contact with the human body. The deleterious effects of these chemicals can range from acute trauma such as skin irritation and burn, to chronic degenerative disease such as cancer. Since engineering controls may not eliminate all possible exposures, attention is often placed on reducing the potential for direct skin contact through the use of protective clothing that resists permeation, penetration, and degradation.

This test method is used to measure the permeation of liquids and gases through protective clothing materials under the conditions of continuous contact of the clothing material by the test chemical. Resistance to permeation under the condition of intermittent contact with the test chemical should be determined by Test Method [F1383](#). In certain situations, the permeation of liquids through protective clothing materials can be measured using a permeation cup following Test Method [F1407](#). Penetration of liquids should be determined by Test Method [F903](#). An undesirable change in the physical properties of protective clothing materials is called degradation. Procedures for measuring the degradation of rubbers, plastics, and coated fabrics are found in Test Method [D471](#), Test Method [D543](#), and Test Method [D751](#), respectively. A starting point for selecting the chemicals to be used in assessing the chemical resistance of clothing materials is Guide [F1001](#).

1. Scope

1.1 This test method measures the permeation of liquids and gases through protective clothing materials under the condition of continuous contact.

1.2 This test method is designed for use when the test chemical is a gas or a liquid, where the liquid is either volatile (that is, having a vapor pressure greater than 1 mm Hg at 25°C) or soluble in water or another liquid that does not interact with the clothing material.

1.3 Values states in SI units are to be regarded as standard. Values given in parentheses are not exact equivalents and are given for information only.

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 determine the applicability of regulatory limitations prior to use. Specific precautionary statements are given in Section 7.

2. Referenced Documents

2.1 ASTM Standards:²

[D471 Test Method for Rubber Property—Effect of Liquids](#)
[D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents](#)
[D751 Test Methods for Coated Fabrics](#)
[D1777 Test Method for Thickness of Textile Materials](#)
[E105 Practice for Probability Sampling of Materials](#)
[E171 Practice for Conditioning and Testing Flexible Barrier Packaging](#)
[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)

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.