



Designation: F903 – 17

Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids¹

This standard is issued under the fixed designation F903; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

Workers involved in the production, use, and transportation of liquid 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 determines resistance of protective clothing materials, seams, and closures to liquid penetration only. Resistance of protective clothing materials to permeation is determined by Test Method **F739** or **F1383**. While degradation resistance is not directly determined by this test method, the degradation of a material can be a contributing factor to the observed penetration of a liquid.

Test Method **F1359** assesses the liquid penetration of full protective clothing items or ensembles of clothing and equipment.

1. Scope

1.1 This test method is used to test specimens of protective clothing materials, assemblies such as seams and closures, or interfaces used in the construction of protective clothing. The resistance to visible penetration of the test liquid is determined with the liquid in continuous contact with the normally outside (exterior) surface of the test specimen.

1.2 This test method includes different procedures for maintaining the liquid in contact with the test specimen in terms of the length of exposure and the pressure applied. Suggestions are provided for how to select an appropriate procedure for liquid contact.

1.3 In some cases, significant amounts of hazardous materials will permeate specimens that pass the penetration tests. For more sensitive analyses use either Test Method **F739** or **F1383** to determine permeation.

1.4 This test method does not address penetration of vapors through protective clothing materials.

1.5 This test method is not applicable to non-planar protective clothing materials, interfaces, or assemblies such as the finger tips or crotch areas of gloves, which are possible failure points.

1.6 This test method does not address the liquid penetration resistance of full protective clothing items or ensembles. Use Test Method **F1359** for this purpose.

1.7 The values as stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.

1.8 *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 hazards are given in Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*²

D1777 Test Method for Thickness of Textile Materials

D3776 Test Methods for Mass Per Unit Area (Weight) of Fabric

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.