Designation: F 903 – 03

Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids[1]

This standard is issued under the fixed designation F 903; 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 to penetration only. Resistance to permeation and degradation should be determined by other test methods.

1. Scope

1.1 This test method is used to test specimens of protective clothing and candidate materials and constructions to be used in protective clothing. The resistance to visible penetration of the test liquid is determined with the liquid in continuous contact with the normally outside surface of the test specimen.

1.2 In some cases, significant amounts of hazardous materials will permeate specimens that pass the penetration tests. For more sensitive analysis use Test Method F 739 to determine permeation.

1.3 This test method is not applicable to finger tips or crotch areas of gloves, which are possible failure points.

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

1.5 *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:*

D 1777 Test Method for Thickness of Textile Materials[2]

E 105 Practice for Probability Sampling of Materials[3]

F 104 Classification System for Nonmetallic Gasket Materials[4]

F 739 Test Method for Resistance of Protective Clothing Materials to Permeation by Liquids or Gases Under Conditions of Continuous Contact[5]

3. Terminology

3.1 *Definitions:*

3.1.1 *degradation*, *n*—a deleterious change in one or more properties of a material.

3.1.2 *penetration*, *n*—the movement of matter through closures, porous materials, seams, and pinholes or other imperfections in protective clothing on a nonmolecular level.

3.1.2.1 *Discussion*—For this test method, the specific matter is a liquid chemical.

3.1.3 *permeation*, *n*—the process by which a chemical moves through a protective clothing material on a molecular level.

3.1.3.1 *Discussion*—Permeation involves the following: (*1*) absorption of molecules of the chemical into the contacted (challenge side) surface of the material, (*2*) diffusion of the sorbed molecules in the material, and (*3*) desorption of the molecules from the opposite (collection side) surface of the material.

3.1.4 *protective clothing*, *n*—a garment used for the purpose of isolating parts of the body from contact with a potential hazard.

[1] This test method is under the jurisdiction of ASTM Committee F23 on Protective Clothing and is the direct responsibility of Subcommittee F23.30 on Chemical Resistance.

Current edition approved January 10, 2003. Published March 2003. Originally approved in 1984. Last previous edition approved in 1999 as F 903 - 99a.

[2] *Annual Book of ASTM Standards*, Vol 07.01.

[3] *Annual Book of ASTM Standards*, Vol 14.02.

[4] *Annual Book of ASTM Standards*, Vol 09.02.

[5] *Annual Book of ASTM Standards*, Vol 11.03.

This document is now PUBLIC

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States.