

PetroWear™ Chemical Splash Outerwear

Summary of relevant information contained in ASTM F 903-04 Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Liquids

Scope: This test method is used to test specimens of protective clothing and materials and constructions to be used in protective clothing for resistance to visible penetration of liquids. In some cases, significant amounts of hazardous materials will permeate specimens that pass this penetration tests. For more sensitive analysis of liquid permeation Test Method F 739 is recommended.

Purpose: This test method provides a quantitative determination of the liquid barrier performance of protective clothing, clothing constructions and materials and is used to evaluate and compare the liquid penetration resistance of protective clothing and materials.

Key Definitions:

Penetration: The movement of matter through closures, porous materials, seams, and pinholes or other imperfections in protective clothing on a non-molecular level.

Discussion—for this test method, the specific material is a liquid chemical (based on a hazard analysis).

Permeation: The process by which a chemical moves through a protective clothing material on a molecular level.

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.

Protective Clothing: A garment used for the purpose of isolating parts of the body from contact with a potential hazard.

Discussion—the potential hazard addressed by this test method is penetration by liquids.

Procedure C

Pressure	Duration
Ambient (0.0 psi)	5 minutes
2.0 psi	1 minute
Ambient (0.0 psi)	54 minutes

Test Method Description:

The test method evaluates the liquid penetration resistance of a single layer or multiple layer material specimen from an item of protective clothing, i.e. the base material of which the protective clothing item is made, a seam or a closure. Specimens may also be from a material intended for use in protective clothing. The test specimen is placed on a test apparatus designated as a “Liquid Penetration Tester” which applies the chemical liquid of interest so that the liquid is in contact with the outside surface of the material specimen (challenge surface). The liquid test temperature can be at ambient conditions or a selected temperature. Procedure C of the test is conducted with ambient pressure for five (5) minutes followed by 2.0 psi pressure applied to the liquid for a period of one (1) minute followed by an additional fifty-four (54) minutes at 0.0 psi. The apparatus provides a viewing window so that the inside surface of the material specimen (collection surface) can be observed during the test. The material specimen passes if the inside surface of the material specimen indicates no presence of liquid at the time selected for the test, and the material specimen fails if the inside surface of the material specimen does indicate the presence of liquid prior to the time selected for the test. The time is noted when the first indication of liquid is observed. Dyes can be added to the liquid to facilitate the determination of liquid penetration.

Significance of Test Results:

This test method is used to evaluate the barrier effectiveness against liquids of materials used for protective clothing and of specimens from finished items of protective clothing such as suits, hoods, gloves, aprons, boots, arm shields. Test yields a pass/fail result.

Application of F 903 Standard Test Method:

This test method provides assistance to end user organizations in selecting appropriate protective clothing for employees who may be exposed to chemical liquid splash hazards.