



DYNAMIC MOISTURE PERMEATION CELL (DMPC) U.S. PATENT 6,119,506

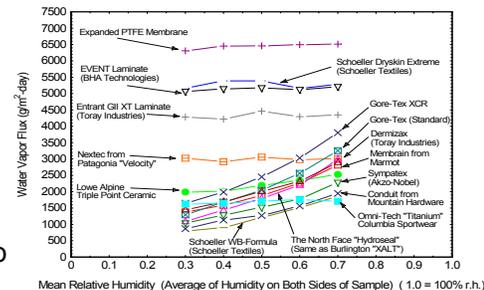
OVERVIEW:

Test method for water vapor transport, "breathability," and air permeability of textiles, coated fabrics, membranes, and films. Results generated with the DMPC agree with standard ISO (International Standards Organization) and ASTM (American Society for Testing and Materials) methods for steady-state testing. A simplified version of the DMPC is the basis for ASTM F 2298, Standard Test Methods for Water Vapor Diffusion Resistance and Air Flow Resistance of Clothing Materials Using the Dynamic Moisture Permeation Cell.



DESCRIPTION:

- Concentration-Dependent Permeability -- Materials such as Gore-Tex or Sympatex change their transport properties based on the amount of water contained in the hydrophilic polymer layer.
- Temperature-Dependent Permeability -- Important for cold weather clothing systems which incorporate materials such as Gore-Tex. Data obtained with this device for several membrane laminates over the temperature range of -15°C to 40°C show that there are significant differences in the way low temperatures affect the diffusion behavior of common laminated membranes.
- Combined Convection/Diffusion -- The ability to test under a combined pressure gradient and diffusion gradient is important for clothing systems which have significant air permeability, since most laboratory test methods evaluate materials under pure diffusion conditions.
- Humidity-Dependent Air Permeability -- Fabrics which absorb water vapor from the atmosphere (such as cotton or wool, and to a lesser extent, nylon) experience fiber swelling which tends to close off the pores in the fabric and increase the resistance to convective flow through the material.
- Transient Sorption/Desorption -- Fabric temperature changes of as much as 10°C to 20°C can occur due to variations in local relative humidity. These changes are related to factors such as the sorption rate at which a fiber takes up or releases water vapor to the environment.



POINT OF CONTACT:

Warfighter Science, Technology and Applied Research (WarSTAR)

COMM: 508-233-4577/6481, DSN 256-4577/6481

E-MAIL: nati-amsrd-nsc-ss@conus.army.mil