Dynamic Moisture Permeation Cell (DMPC)

Overview:

An innovative device for measuring water vapor transport and air permeability of textiles, coated fabrics, membranes, and films. This automated computer-controlled apparatus is more convenient to use than the traditional test methods for textiles and clothing materials. 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. The device is very useful for determining the importance of the effects listed below:

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. The magnitude of the changes in water vapor diffusion resistance as a function of membrane water content can be determined for a variety of common clothing materials and systems.
- **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. Test results generated with this apparatus show that is easy to find fabrics which double their resistance to convective flow due simply to changes in relative humidity.
- **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.

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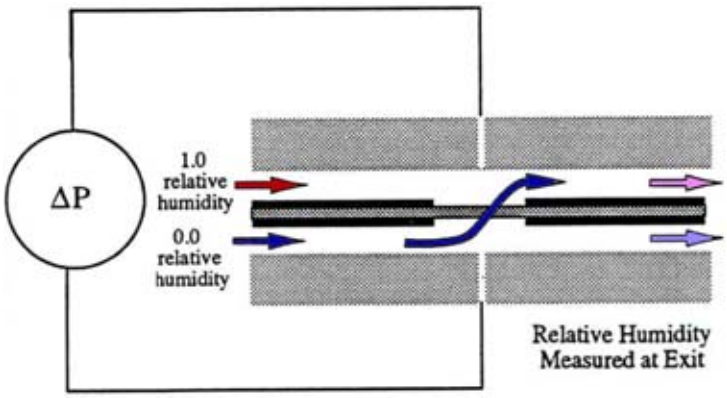

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