

Diffusion Permeameter

Applications

Many applications of porous materials require very low gas permeability through these materials. Such applications are found in many industries including biotech, healthcare, pharmaceutical, food, packaging, environmental, power sources and chemical industries. Determination of the magnitudes of flow rates of gas through materials used in these applications is important for evaluation of products.

Principles of Operation

The basic principle is based on the laws of diffusion.

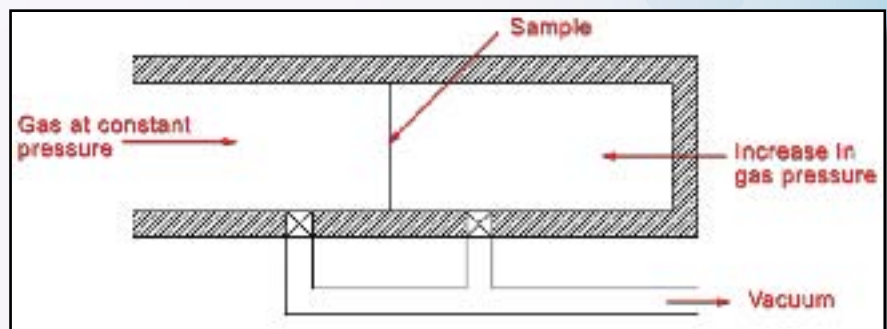
$$F = - M [dp/dx]$$

where F is the flux across the sample, $[dp/dx]$ is the pressure gradient across the thickness, and M is a measure of diffusivity. The instrument is designed to accurately measure pressure and flow rate. The sample chamber is evacuated. Gas pressure maintained at a constant value on one side of the sample is measured and the increase in pressure on the other side is also measured. The data are used to compute flow rate of gas per unit area of the sample per unit time as a function of pressure gradient.

The gas flow rate is computed using the following relation.

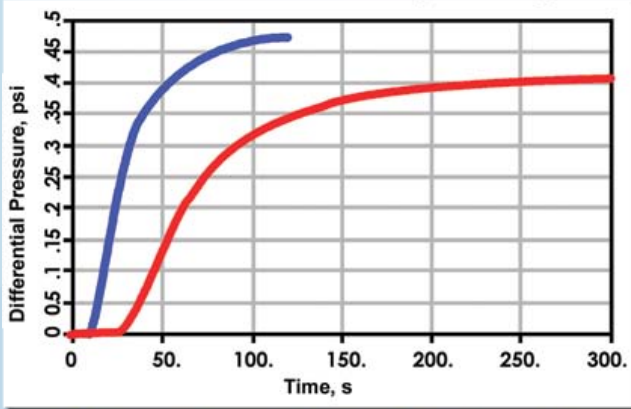
$$F = \left(\frac{V T}{P_s T_s} \right) (dp/dt)$$

where F is the gas flow rate in volume at STP per unit time, V is the volume of outlet chamber, P_s is the standard pressure, T is the standard temperature, T_s is the test temperature, and (dp/dt) is the time rate of pressure increase in the outlet chamber.

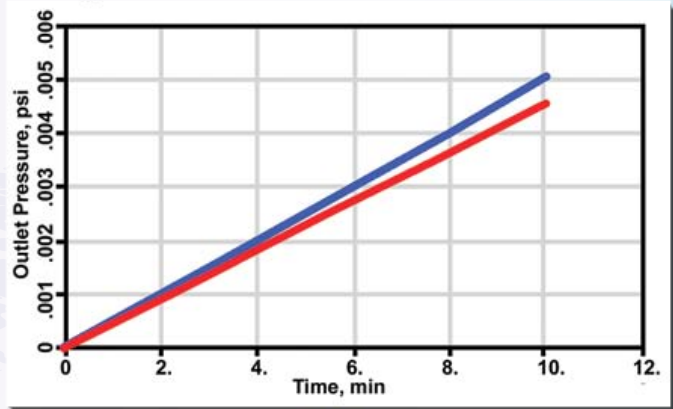


Capabilities

- Measures flow rate as low as 10^{-4} cm³/s
- Elevated operating temperatures up to 800°C
- Elevated pressure tests up to 200 psi
- A variety of gases & vapors can be tested
- Sample can be tested under compression up to 1000 psi



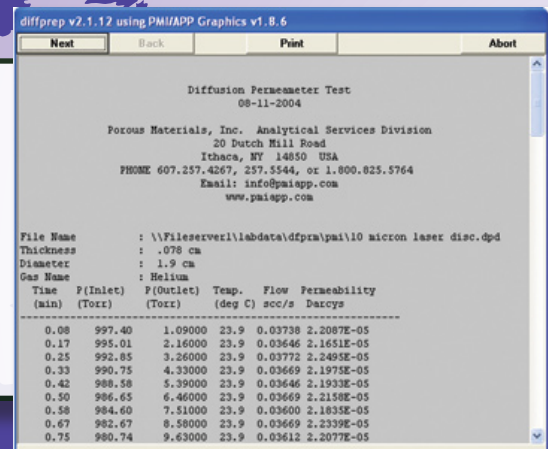
Vapor Through Nafion Membrane



Air

Features

- The sample chamber is maintained at a constant temperature for yielding reliable and reproducible data.
- Fully Automated
- Very little operator involvement
- Robust. Minimal maintenance
- Accuracy of pressure measurement is 0.15% of reading



Other Products

Advanced Capillary Flow Porometer
 Average Fiber Diameter Analyzer
 Capillary Flow Porometer
 Capillary Condensation Flow Porometer
 Complete Filter Cartridge Analyzer
 Clamp-On Porometer
 Compression Porometer
 Cyclic Compression Porometer
 Envelope Surface Area Analyzer
 Filtration Media Analyzer
 High Flow Porometer
 Integrity Analyzer
 In-Plane Porometer

Multipoint Simultaneous Pore Structure Analyzer
 Microflow Porometer
 Multi-Chamber and Multi-Mode Porometer
 Nanopore Flow Porometer
 QC Porometer
 Diffusion Permeameter
 Gas Permeameter
 Gas Diffusion Analyzer
 Liquid Permeameter
 Vapor Permeameter
 Water Vapor Transmission Analyzer
 Liquid Extrusion Porosimeter
 Mercury/NonMercury Intrusion Porosimeter

Water Intrusion Porosimeter (Aquapore)
 BET Liquisorb
 BET Sorptometer
 Gas Pycnometer
 Mercury Pycnometer

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