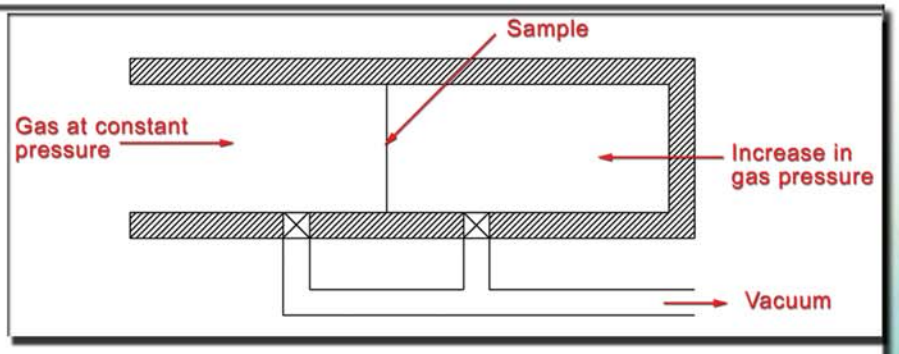
Diffusion Permeameter

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.

Principle



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.

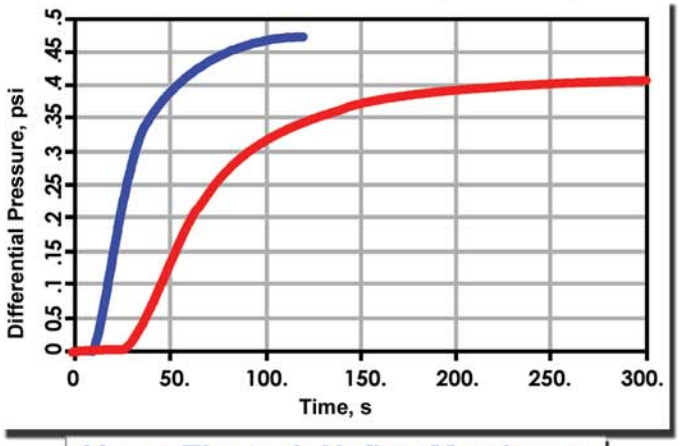
The gas flow rate is computed using the following relation.

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

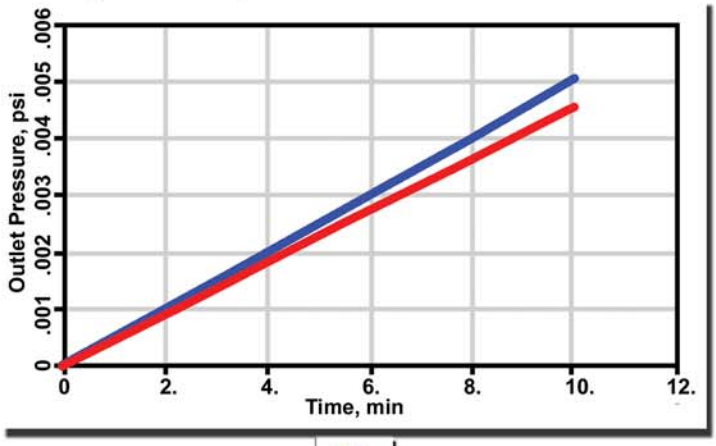
where F is the gas flow rate in volume at STP per unit time, V is the volume of outlet chamber, P_s is the standard pressure, T_s is the standard temperature, T is the test temperature, and (dp/dt) is the time rate of pressure increase in the outlet chamber.

Capabilities

- Measures flow rate as low as 10^{-4} cm^3/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



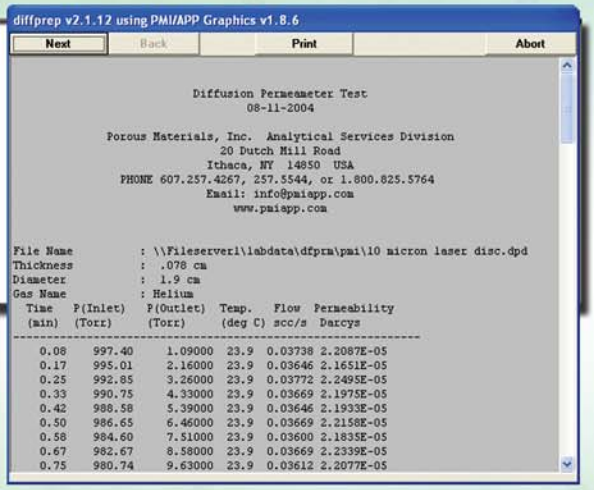
Vapor Through Nafion Membrane



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: 0.15% of reading



Other Products

- Capillary Flow, QC, In-Plane, Clamp-On, Microflow, Compression, and Cyclic Compression Porometers
- Bubble Point, Cartridge, and Integrity Testers
- Liquid Extrusion Porosimeter
- Liquid/Gas/Vapor Permeameters
- Envelope Surface Area Analyzers
- Water Vapor Transmission Analyzer
- Pycnometers
- Mercury/Nonmercury Porosimeters
- BET Surface Area and Pore Analysis Sorptometers
- Testing Services and Consulting Services

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