

# THE PMI ADVANCED AUTOMATED HUMID AIR POROMETER

## HCFP-1100AE



Not just products...*solutions!*

## Principle

A wetting liquid is allowed to spontaneously fill the pores in the sample and a nonreacting gas is allowed to displace liquid from the pores. The gas pressure and flow rates through wet and dry samples are accurately measured. The gas pressure required to remove liquid from the pores and cause gas to flow is given by:

$$D = 4 \gamma \cos \theta / p$$

where D is the pore diameter,  $\gamma$  is the surface tension of liquid,  $\theta$  is the contact angle of liquid, and p is the differential gas pressure. From measured gas pressure and flow rates, the pore throat diameters, pore size distribution, and gas permeability are calculated.

## Applications

Advanced Automated Porometers yield very objective, accurate and reproducible results, considerably reduce test duration, and require minimal operator involvement. The machine is fully automated and designed for linear turbulence-free test gas flow. The pressure is measured close to the sample and therefore, the correction term in the differential pressure measurement is minimized. Required amount of pressure is uniformly applied to the o-ring seals on the sample and the need for hand tightening the cap on the sample chamber is eliminated. Automatic addition of wetting liquid reduces test time appreciably. This sophisticated instrument has found applications in a wide variety of industries.

## Capabilities

- Diameter of the most constricted part of a through pore (pore throat)
- Bubble Point (the largest through pore throat diameter)
- Mean flow pore diameter (50% of flow is through pores smaller than the mean flow pore)
- Pore diameter range
- Pore distribution
- Gas permeability in many desired units including Frazier, Gurley, Rayl, and Darcy

## Optional Capabilities

- Liquid Permeability: Measures liquid flow rate through the sample when pressure is applied on excess liquid on the sample. Volume of liquid measured using penetrometer
- Pressure Hold Test
- Hydro-head (break through pressure) test
- Integrity Test
- Envelope Surface Area, Average particle size, Average fiber diameter obtained from gas flow rate through dry sample
- Multiple sample chambers
- Smoothness test
- Burst pressure test
- Use of strong chemicals as working fluid like KOH solution and saline solution
- Elevated temperature test up to 200°C

## Unique Features

- No need to undo the sample chamber for wetting the sample
- Considerable reduction in test duration
- The sample is not disturbed during wetting
- Exactly the same area is tested
- Results are more accurate and reproducible
- The sample chamber at the bottom of the piston rod contains o-rings on the outside to prevent leak between the insert and the sample housing of the sample chamber
- The need for cutting samples for testing is eliminated

## Features

- Testing of small samples as well as complete parts
- Many sample geometries (example: sheets, rods, tubes, hollow fibers, cartridges, and powders)
- Use of many nonwetting liquids (example: water, alcohol, silwick and galwick)
- Tests in QC, research, or any number of user-defined modes
- See-through sample chamber available for visual observation of test
- Real-time graphical display
- Windows-based software for all control, measurement, data collection, data reduction, and report preparation
- Fully automated and computer controlled

# Specifications\*

- Pore Size Range: 0.013 - 200 microns
- Permeability Range:  $1 \times 10^{-3}$  - 50 Darcies
- Sample Size: 1.75" - 2.5" diameter
- Maximum Pressure: 500 psi
- Pressurizing Gas: Clean, dry, and compressed air or nonflammable and noncorrosive gas
- Pressure Transducer Range: 0 - 500 psi
- Flow Rate: 200 LPM
- Resolution: 1 in 60,000
- Accuracy: 0.15% of reading
- Mass Flow Transducer Range:  $10 \text{ cm}^3/\text{min}$  -  $500,000 \text{ m}^3/\text{min}$
- Power Requirements: 110/220 VAC, 50/60 Hz (others available)
- Dimension: 61" H x 30" W x 26" D

\* Other specifications for this machine are available. Specifications are subject to change without notice.

## Sales & Services

Our sales team is dedicated to helping our customers find which machine is right for their situation. We also offer custom machines for customers with unique needs. To find out what we can do for you, contact us.

We are committed to customer support including specific service products, short response times & customer specific solutions. To quickly & flexibly meet our customer's requirement, we offer a comprehensive range of services.



*Customize your machine today!*



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Toll Free (US & Canada): 1-800-TALK-PMI (1-800-825-5764)  
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and reproducible porometers in the world.



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