

# THE PMI CAKE FORMING POROMETER



Not just products...*solutions!*

# Application

This is a unique instrument - capable of creating cakes in-situ on filtration media and characterizing pore structure characteristics of filtration media with and without cake. The cake is able to be created under a wide range of test conditions. The instrument is used for cost effective analysis of cake filtration processes and development of appropriate technologies.

# 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.

# Effect of the Cake on Pore Structure

Sample	Bubble Point, $\mu\text{m}$	Mean Flow Pore Diameter, $\mu\text{m}$
Filter	25.94	3.11
Filter with Cake due to Oil Filtration	7.15	2.05
% Change	72%	34%

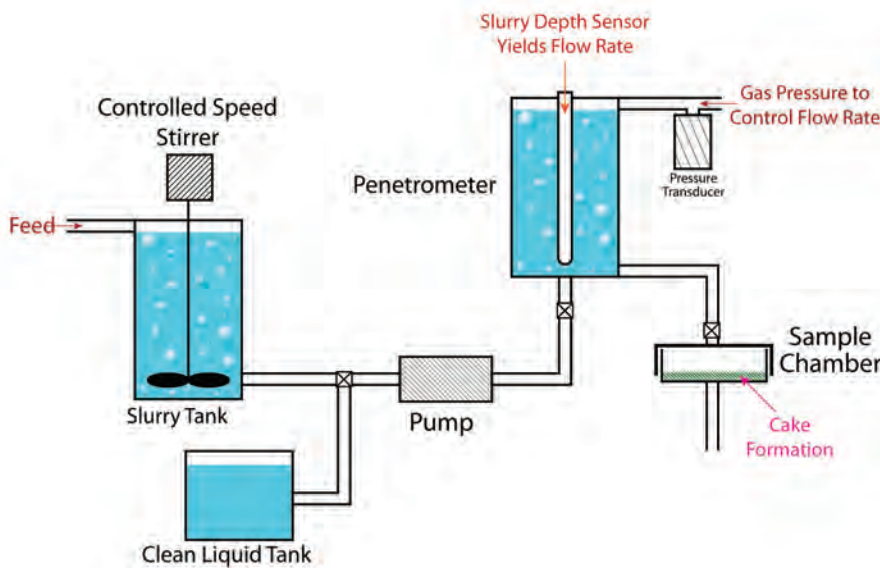


Figure 1

Outline of the basic principle behind Cake Forming Porometer

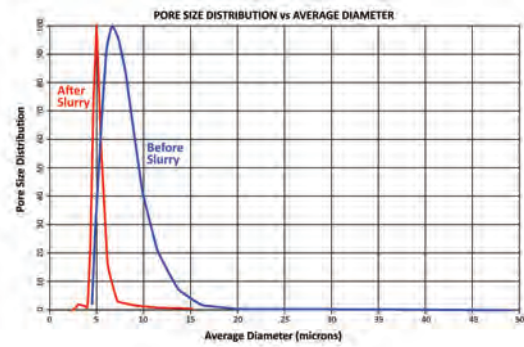


Figure 2

Pore distribution chart

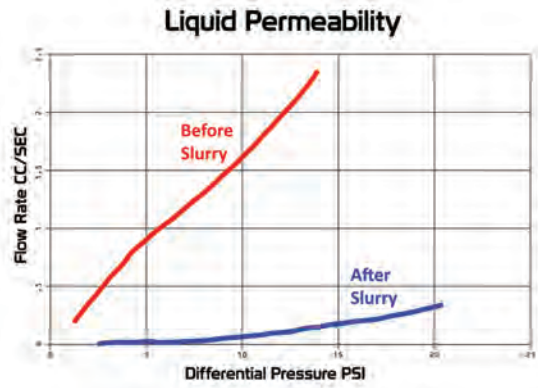


Figure 3

Variation of flow rate with change in pressure

## Unique Features

- 3 Sample Chambers for:
  - Pore Size Distribution
  - Cake Forming
  - Liquid Permeability
- Capable of forming cakes under user specified:
  - pressure
  - flow rate
  - concentration
- Cleaning of system to prevent clogging
- Ability to measure pore structure characteristics, including:
  - Bubble point
  - Mean flow pore diameter
  - Pore distribution
  - Liquid permeability
- Full automation for repeatable results obtainable without much operator involvement

## Specifications\*

**Pore Size Range:** 0.03 to 100 microns

**Permeability Range:** 0.001 - 100 cc/min

**Sample Size:** ¼" - 2" diameter

5mm - 50mm

0" - 1" thick

**Pressure Range:** 0 - 110 psi

**Resolution:** 1 in 60,000

**Accuracy:** 0.15% of Reading

**Power Requirements:** 110/220 VAC, 50/60 Hz

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



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and reproducible porometers in the world.



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