



# ADVANCED WATER LIQUID LIQUID POROMETER LLP-1500A

*Not just products... Solutions*

## PRINCIPLE

Designed for pore structure characterization of materials such as membranes, filter media, ceramics, paper, textile, etc., having very small pore sizes. It is capable of measuring pore diameters, pore distribution and liquid flow rate of materials having very low permeability.

## PRINCIPLE

A wetting liquid spontaneously fills the pores of the material. Two immiscible wetting liquids are selected. Liquid 1 with lower surface tension is used to fill the pores of the sample. Liquid 2 is added to the top of the sample and is pressurized to displace the first from the pores and flow through the empty pores. The flow rate of Liquid 2 is also measured without wetting the sample with Liquid 1. The pore diameter is related to the surface tension of the two liquids. The flow rates yield pore distribution and liquid permeability.

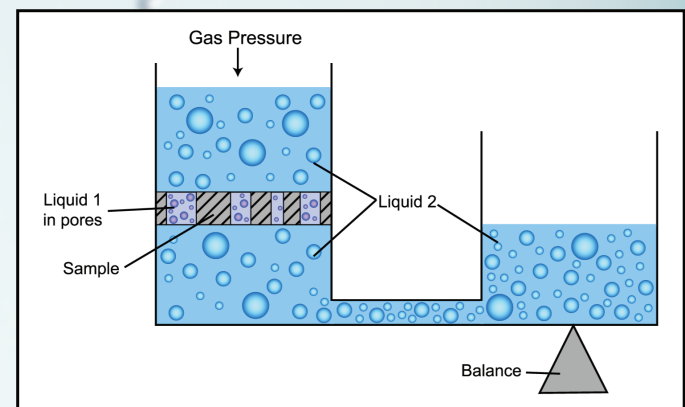


Figure 1

Basic design for analysis procedure

$$D = 4 \gamma_1 \cos \theta_1 / p$$

Where:

$D$  = pore diameter

$\gamma_1$  = Interfacial surface tension of liquids

$\cos \theta_1$  = contact angle of liquid 1 on pore surface

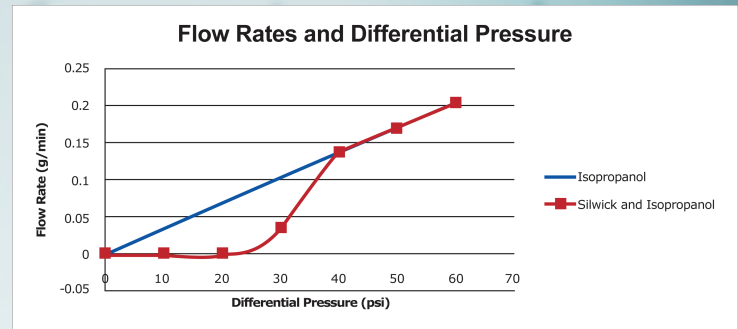
$p$  = differential pressure applied on the sample by liquid 2

## TEST PROCEDURE

Two immiscible & saturated wetting liquids such as silwick and alcohol are taken. Pores are filled with silwick and alcohol is pressurized to displace the silwick and flow through the pores. The amount of liquid flowing out is measured in balance. Alcohol flow rate and differential pressure are measured. Because surface tension of silwick and alcohol are low, contact angles are taken as zero. Mean flow pore diameter and pore distribution are computed like CFP.

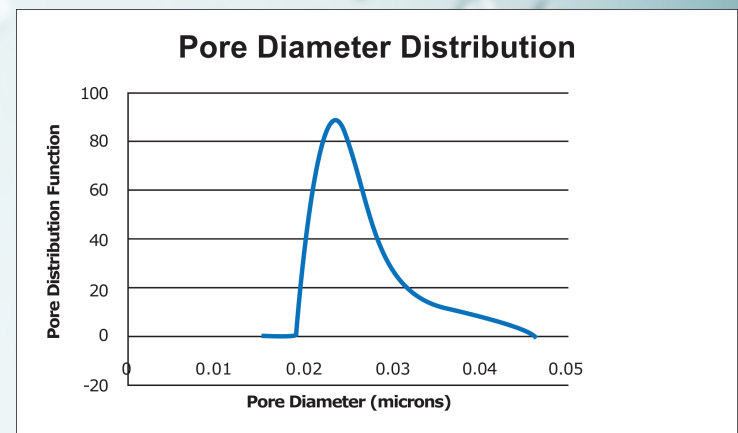
## UNIQUE FEATURES

- Very low liquid permeability measured
- Fully automated, user friendly operation
- Pore diameters down to 3 nanometers are measurable
- Pressures needed are much less than those for capillary flow porometer



## SPECIFICATION

- Pressure Range: 0 - 500 psi
- Pore Size Range: 0.003 - 20 microns
- Resolution: 1 in 60,000
- Flow Resolution: 0.0001 cc/min
- Sample Size 5mm - 50mm diameter, Foil to 1"



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