

INSTRUCTION SHEET

Catalog #7441-7445 Soap Bubble Meters

PREPARATION

Fill the Erlenmeyer flask approx. 1/2 full with soap solution

Attach the stopcock to a pressure source via one of the arms.

Attach the upper tubulation to the gas source. Wet the measuring vessel and allow it to drain for a few minutes, then insert the detachable vessel into the flask joint.

MEASUREMENT

Start gas flow.

Pressurize the soap solution in the flask so that it rises slowly to the point of interception by the gas stream.

At this point, a bubble will be formed and the soap film will rise onto the measuring vessel.

Time the rise of the film between two convenient marks; use a stopwatch if available.

The volume measured is referenced to 20° C. However, standard conditions for gas are 0° C and 760 mm Hg barometric pressure. At 0° C the vessel will be contracted in volume with respect to 20° C and a correction can be applied by using the cubical coefficient of expansion $10 \times 10^{-6}/\text{cc}/^{\circ}\text{C}$ for the interval 20° C to 0° C; this can usually be neglected.

The gas volume must also be corrected to standard conditions using observed temperature °K and barometric pressure.

VAPOR PRESSURE CORRECTION

$V = \text{vol. occupied by vapor for approximations where } P = \frac{g}{MV RT} \quad M = \text{Mol. Weight} \quad p = \text{vapor pressure}$

For more accurate calculations, allowance must be made for the fact that the total volume of gases is increased by the introduction of a vapor.

The volume v of both air and vapor, through which vapor molecules are distributed, is

$$v = \frac{v' P}{P-p}$$

v' = vol. pure air before saturation

P = barometer

p = vapor pressure of liquid or solid

v is measured, v' is desired so:

$$\frac{v(P-p)}{P} = v'$$

at 20° C $p = 18 \text{ mm H}_2\text{O}$

if $P = 760 \quad p = 742$

or $v' = .975 v$ or $v' = 975\text{cc vs } 1 \text{ L}$

Air becomes saturated with water vapor very rapidly, and it is safe to assume that $p = 18\text{mm Hg}$ at 20° C.



P.O. Box 688 • Vineland, NJ 08362-0688 • 856-692-3333 • Fax: 1-800-543-6752

TOLL-FREE: 1-800-223-4524

www.aceglass.com e-mail: sales@aceglass.com