

PAYNE PERMEABILITY CUP

Ref: 1003 / 1003A



INTRODUCTION

This apparatus provides a simple, reliable means for measuring the permeability to moisture of paint, varnish and lacquer film.

FEATURES

The apparatus consists of a flanged "Duraluminium", cup to which a disc of material under test is clamped by means of an inner ring and screw cap. Various backing materials have been suggested for supporting the film under test. Experiments have been carried out on silk bolting cloth, glass cloth, fine tracing paper and, in particular, "Patapar" 30 Ib. manufactured by the Paterson Parchment Paper Co. of U.S.A. (A near British equivalent is 45 gram weight parchment paper.)

The ring and flange of these cups are accurately machined to given exposure to exactly 10cm² of film; the ratio of exposed area to total film area is therefore 0.4: 1. Larger cups can also be supplied to yield a greater area of 25 cm².

METHOD OF USE

Cut out a number of discs both of the coated and uncoated material using one of the rings as a template. Select three representative discs of each type and by weighing, determine the total weight of film on each coated disc. Multiplying this weight by 0.4 gives the weight of the film area 10 cm².

By using the following formula, its average thickness in mm's can be arrived at:

$$\text{*Film thickness in mm} = \frac{\text{Total weight of film in grams} \times 0.4}{\text{Specific gravity of film}}$$

Before selection, each disc should be checked, by micrometer, any disc showing a variation greater than 0.04mm. (0.0015 in) in the thickness of film should be rejected. Place approximately 5 cm² distilled water in each of three cups, take three selected and prepared discs and place them, film side downwards, one over each cup, tighten down to form vapour tight seal. Weigh to 0.1 mg. The cups are then placed in a desiccator which is maintained at a temperature of close to 38°C in a constant temperature chamber. The desiccator should contain phosphorous pentoxide to give a state of very low relative humidity within. Removal of these cups and periodic weighing every 24 hours will give the weight of water vapour which has permeated through the film in that time. The test should be run in triplicate because film imperfections, which are not easily seen, cause abnormally high loss rates.

The specific permeability may be expressed by the following formula:

$$\text{Specific permeability @ 38°C} = \frac{\text{Loss in weight (grams)} \times 100 \times \text{film thickness (mm.)} \times 24}{\text{Number of hours test}}$$

*Footnote:

The formula for "Film Thickness in mm." is based on: Area x Thickness = Volume = $\frac{\text{Weight}}{\text{Specific Gravity}}$

ORDERING INFORMATION

Ref. 1003 (mass nominal 50 grams)
 Ref. 1003A (mass nominal 150 grams)

Owing to continuous development. we reserve the right to introduce improvements and modify specifications without prior notice.

Sheen INSTRUMENTS

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