

# **Elcometer 5100**

## **Payne Permeability Cup**

### **Operating Instructions**

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A copy of this Instruction Manual is available for download on our Website via [www.elcometer.com/downloads](http://www.elcometer.com/downloads).

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Thank you for your purchase of this Elcometer 5100 Payne Permeability Cup. Welcome to Elcometer.

Elcometer are world leaders in the design, manufacture and supply of inspection equipment for coatings and concrete. Our products cover all aspects of coating inspection, from development, through application to post application inspection.

This Elcometer 5100 Payne Permeability Cup is a world beating product. With the purchase of this product you now have access to the worldwide service and support network of Elcometer. For more information visit our website at [www.elcometer.com](http://www.elcometer.com)

## **1 ABOUT THIS INSTRUMENT**

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The Elcometer 5100 Payne Permeability Cup is a simple instrument which is used to determine the vapour transmission rate of unsupported films of paint, varnish, plastic, paper, etc.

The Payne cup is filled with a suitable liquid or dry desiccant and then the film being tested is clamped and sealed across the open end of the cup.

The assembly is weighed at the start of the test and again at the end. Any difference between the two weights will be due to water-vapour which has permeated through the film in a given time.

The instrument is simple to use and is available in three sizes to suit the requirements of the film being tested. The instrument is manufactured from anodised aluminium.

### **1.1 STANDARDS**

Your Elcometer 5100 Payne Permeability Cup can be used in accordance with the following National and International Standards:

ASTM D1653; ASTM E96; ISO 7783 supersedes NF T30-018.

## 1.2 WHAT THE BOX CONTAINS

- Elcometer 5100 Payne Permeability Cup
- Storage case
- Operating instructions

The Elcometer 5100 Payne Permeability Cup is packed in a cardboard and foam package. Please ensure that this packaging is disposed of in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

**To maximise the benefits of your new Elcometer 5100 please take some time to read these Operating Instructions. Do not hesitate to contact Elcometer or your Elcometer supplier if you have any questions.**

## 2 TAKING A MEASUREMENT



Take care to avoid damaging your Elcometer 5100 Payne Permeability Cup. Deformation or other damage to the cup flange or sealing ring will affect the readings and the instrument may have to be replaced.

### 2.1 TEST PROCEDURE

1. Prepare the film to be tested.



**Figure 1. Elcometer 5100 Payne Permeability Cups**

## elcometer®

The coating has to be applied<sup>a</sup> onto a substrate (eg Leneta RP-1K) which allows the film to be removed after it has dried. Silicone coated paper is suitable for many types of coating, however the user of the cup should determine the most suitable substrate for their application.

2. Fill the Payne cup with specified liquid or dry desiccant.
3. Place the film carefully over the top of the cup ensuring that the film covers the flange of the cup.
4. Place the rubber gasket and the sealing ring on the film and secure using the clamps provided.
5. Weigh the assembly and record the result in grams ( $m_1$ ).
6. Leave the cup undisturbed for the period of time stated in the standard conditions.
7. At regular intervals re-weigh the assembly and record the result in grams ( $m_2$ ) until linear.
8. Calculate the water-vapour transmission rate of the film in grams per sq. metre per day ( $\text{g}/(\text{m}^2 \cdot \text{d})$ ):

$$P = 240 \times \Delta m / A$$

Where  $\Delta m$  = rate of change in mass in mg/h, and A = area in square centimetres of test piece taken from the following table:

Cup	Area
Elcometer 5100/1	10 cm <sup>2</sup>
Elcometer 5100/2	30 cm <sup>2</sup>
Elcometer 5100/3	30 cm <sup>2</sup>

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- a. Elcometer supplies a wide range of manual and motorised film applicators. See “Related equipment” on page 6 for more information.

## 2.2 AFTER THE TEST

Clean the cup and lid.



Do not use wire brushes, metal scrapers, metal files or other metallic tools for cleaning.



Clean the cup, rubber gasket and sealing ring using a suitable solvent.

After cleaning, ensure that all materials are removed and that the instrument is dry.

## 3 SPARE PARTS & ACCESSORIES

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Your Elcometer 5100 Payne Permeability Cup is complete with all the items required to start taking measurements. Over the life of the instrument, replacement rubber gaskets may be required:

<b>Rubber gasket</b>	<b>Part number</b>
Elcometer 5100/1	KT005100P001
Elcometer 5100/2	KT005100P002
Elcometer 5100/3	KT005100P003
Leneta Chart RP-1K (250 pcs)	K0004695M112

## 4 THE ELCOMETER 5100 RANGE

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Model	Volume	Area		Part Number
	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(sq. inch)	
5100/1	15	10	1.55	K0005100M201
5100/2	50	30	4.65	K0005100M202
5100/3	75	30	4.65	K0005100M203

## 5 RELATED EQUIPMENT

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In addition to the Elcometer 5100 Payne Permeability Cup, Elcometer produces a wide range of other coating testing equipment. Users of the Elcometer 5100 Payne Permeability Cup may also benefit from the following Elcometer products:

- Elcometer Laboratory Scales
- Elcometer Film Applicators
- Elcometer Motorised Film Applicators

For further information contact Elcometer or your local supplier.

Details of Elcometer offices around the world are given on the outside cover of these operating instructions. Alternatively visit the Elcometer website, [www.elcometer.com](http://www.elcometer.com)