

(a) Purity of Gases

In these experiments the hydrogen used was supplied by the British Oxygen Co., Ltd., and was guaranteed to contain less than 0.5% impurities (nitrogen and carbon monoxide). The helium, separated from natural gas by a liquefaction process, had been purified by a continuous-flow charcoal-absorption method¹ and was practically 100% pure.

(b) Temperature Control

As permeability has a considerable temperature coefficient, the permeameter and coils enclosed in dotted lines in Fig. 1 were placed in an electrically controlled thermostat maintained at a constant temperature (15.5°C. for the majority of the tests). The variation of the thermostat temperature was about 0.1°C. In some preliminary tests when the temperature was not at 15.5°C, the hydrogen permeability was corrected to the temperature of the helium permeability, using a temperature coefficient of 5%. This correction (for less than 1°C.) was applied to results IIA, IIIA, IVA, VA and VIA in Table III given below.

(c) Rate of Air Flow

The rate of air flow was varied from about 2 to 15 litres per hour according to the type of fabric under examination.

(d) Pressure Control

The gas and air drums of the permeameter were connected by a differential gauge and the pressure on the gas side controlled so as to give an excess gas pressure over air of about 3 cms. water. *Extreme* accuracy of control was not aimed at, but the pressure difference was substantially the same for the same fabric for hydrogen and for helium.

(e) Time for Equilibrium

After adjustment of the gas and air rates, readings of the gas outlet Katharometer were taken until it was ascertained that the gas chamber was completely filled with gas—except for the small amount of air leaking through the fabric. The diffusion of gas into the air chamber was followed by Katharometer observations. It was found that a period of an hour sufficed for equilibrium conditions to be established.

¹ Edwards and Elworthy. Proc. Roy. Soc. of Canada, 1919.