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Electrical Resistivity of Refractories

DETERMINATION AT HIGH TEMPERATURES

In selecting suitable refractories for electric melting furnaces it is necessary to know how their resistivity varies with temperature, but data on this subject are not always available. To measure the resistivity of such materials at temperatures up to 1500°C an apparatus has been designed and built at the Pilkington Brothers Research Laboratories by J. Fenerty and C. E. Smith and is described in a recent paper (*Glass Technology*, 1964, 5, (2), 78-81).

The sample, in the form of a one-centimetre cube, is heated in a vertical muffle furnace, wound with 20 per cent rhodium-platinum wire on a fused alumina tube. This furnace is fitted with two synthetic mullite tubes, each containing a platinum:rhodium-platinum thermocouple and a platinum lead to an electrode. To ensure good electrical contact with the electrodes, two opposite faces of the sample are coated with a thin film of platinum, either by cathodic sputtering or by means of a paste consisting of metallic platinum in suspension in an organic medium.

The furnace is heated to the maximum temperature required with the test sample

held between the two electrodes and resistance readings are taken, by means of a modified Tinsley electrolytic conductivity bridge, at intervals during controlled cooling.

