

551·508·54

THERMISTOR ANEMOMETER*

In recent times thermistors have been found to be most suitable for various purposes in view of their smallness in size, quickness in response, reliability in operation and high negative temperature co-efficient of resistance. The possibility of adapting F and M type thermistors manufactured by Standard Telephones and Cables Ltd, London, as anemometers had been explored. These are normally used for temperature measurements. The maximum current which could be safely passed through them would not be sufficient to make them sensitive to wind velocities exceeding small values (say 5 mph). Moreover, operation of thermistor at high currents (though within the limits) is perhaps not desirable and also does not yield best results as will be seen later. In view of this, an alternate arrangement was tried to make the thermistors function as anemometers responding to a wide range of velocities. By means of an external coil the beads were kept hot and only a current which does not heat the beads was passed. The main advantage in passing a non-heating current through the beads is that the change in resistance with temperature is more for non-heating currents than for heating currents (Hales 1948). This arrangement also will not permit measuring wind velocities up to 20 mph or more. The desired effect was

* Work done at the Andhra University, Waltair

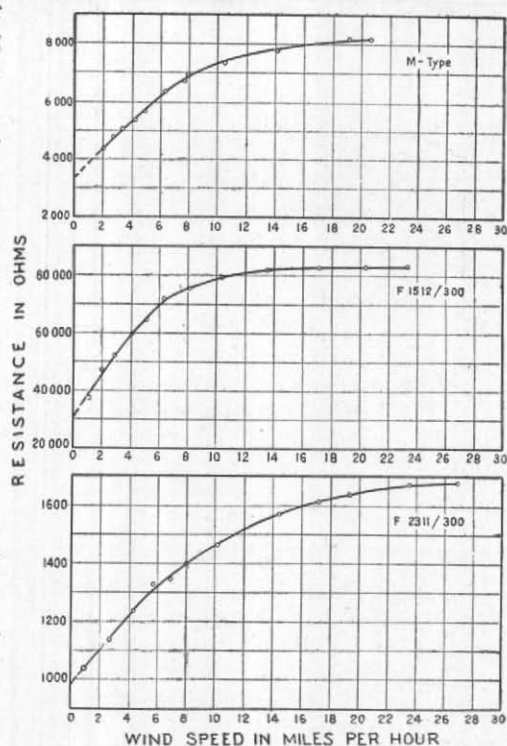


Fig. 1. Wind speed resistance characteristics of the thermistors

however produced by wrapping round the heating coil with insulating material (say asbestos) of suitable thickness. With this arrangement and by passing about 80 to 100 ma of current through the heating coil of M and F type thermistors respectively, these were tested for wind velocities up to about 20 mph and the resulting wind speed-resistance curves are shown in Fig. 1. Also the ratio of change in thermistor resistance to cold resistance, for various speed ranges of 2 mph interval was plotted in Fig. 2 to study the performance of the thermistors.

The following features are observable on a study of the two graphs—

- (i) All the thermistors are very sensitive for the wind speed range 0–6 mph. However F 2311/300 is the most sensitive of the three thermistors in this range, M-type coming

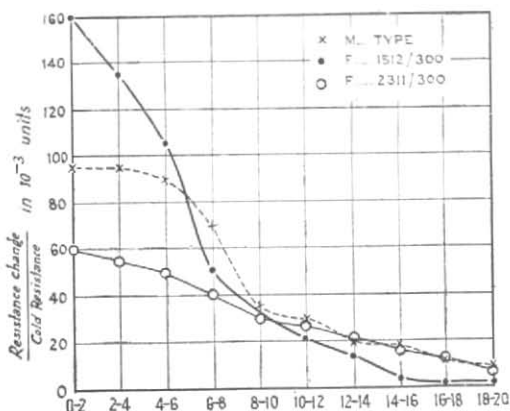


Fig. 2. Wind speed range in mph

next. The wind speed-resistance curve is nearly straight up to about 6 mph in the case of F 2311/300 and M-thermistors.

- (ii) The sensitivity is moderate and rapidly falls for speeds from 6 to 10 mph for all the thermistors. In this speed range M-type thermistor has got the highest sensitivity while F 2311/300 the lowest.
- (iii) For the range 10 to 20 mph in the case of F 2311/300 and M-

thermistors and 10 to 14 mph for F 1512/300 thermistor the sensitivity is fair.

The above anemometers, being very sensitive to low speeds, are very useful for micro-meteorological studies. There is, however, one defect with the thermistors. The thermistors being sensitive to temperature, the resistance changes with ambient temperature. This difficulty could be got over by employing a similar thermistor in the opposite arm of the bridge circuit.

There is however need for further work on certain aspects of these anemometers, viz., lag co-efficient and constancy of performance. In addition the external heating coil device is to be perfected.

C. POORNACHANDRA RAO

*Meteorological Office,
Poona
October 17, 1955.*

REFERENCE

- Hales, Wayne B. 1948 *Bull. Amer. met. Soc.*,
29, 10, p. 495.

Erratum for Vol. 7 No. 2

Page 97, para 2, line 9, for "reached" read "reacted"