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DATA FOLDER No. 72189.....

Title Inter-Electrode Capacitance Measuring Test for
Lighthouse Tubes

By

Electronics Dept., Tube Div.

Information prepared for Electronics Dept., Tube Div.

Tests made by.....

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INTER-ELECTRODE CAPACITY MEASURING TEST
FOR LIGHTHOUSE TUBES

ELECTRONIC TUBE ENGINEERING DEPT.

May 2, 1944

ABSTRACT:

A circuit is described which measures interelectrode capacities of tubes by the change in ac voltage across a resonant circuit.

INTER-ELECTRODE CAPACITY MEASURING TEST
FOR LIGHTHOUSE TUBES

In order to measure capacities on the types GL-446, GL-464, and GL-559 tubes at different stages of actual manufacture, the circuit shown in Figure 1 was designed.

The circuit consists of a D.C. power supply, a one megacycle crystal oscillator, a near resonance circuit in which the tube to be tested is placed, and a detector.

Output is obtained from the crystal oscillator by link coupling to the near resonance circuit and this circuit is coupled again to the detector circuit. The detector is connected to a 0 to 200 microammeter so that when a signal comes from the crystal oscillator the meter indicates.

Figure 2 shows the resonance curve (capacity vs. voltage) for the near resonance circuit, LC. The C is set at a value A which produces a voltage E_a across the LC circuit. The sensitivity of the detector is

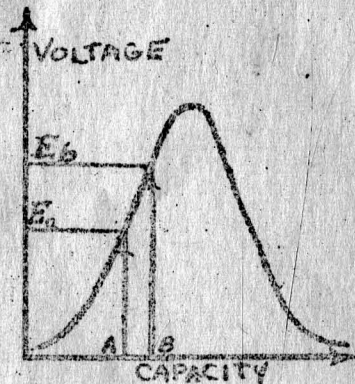


Fig. 2

adjusted by R until the 0 to 200 microammeter reads at the center of the scale. When a tube is placed in the near resonance circuit its capacity brings the total capacity of the circuit to the point B and the voltage across the circuit becomes E_b , this giving a high reading on the meter in the detector. The calibrated capacitor which is also across the circuit is then reduced until the microammeter again reads at the center of the scale. This indicates that the voltage is the same as it had been before the tube capacity had been added. Therefore, we have moved from point A to point B back to point A on the resonance curve, and the amount of capacity reduced in the calibrated capacitor gives the tube capacity.

The above method has been used successfully to measure grid-cathode capacity and grid-plate capacity on the GL-464A, GL-446A and B tubes. A cross check of this circuit with the Western Electric Capacity Bridge shows that the new circuits accuracy is within ± 2 per cent.

If the tube added to the circuit contains R.F. loss the reading will be incorrect because of the lowered Q of the LC circuit. This error is not present in measurements made on the tubes now in production because they do not have high R.F. losses.

W. E. Cronburg

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May 2, 1944

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