

## ABSTRACT

This final project departs from research on a capacitance capacitors are influenced by the nature of the material that is between the two pieces of metal on the capacitor . One of these is the permittivity of the material . Permittivity of a material can be used as a reference for measuring the purity of the material . The level of purity of materials is an important parameter in determining the quality of the material.

In this research will be designed a microcontroller based measurement system to determine the permittivity of a dielectric material . The tool consists of several sub-circuits , including sensors , LCD and microcontroller . Serves to change the permittivity sensor into digital data by the way : the fluid permittivity measured is converted into capacitance through the cylindrical capacitive sensor coupled to the circuit such that the capacitance affects the frequency of the pulses generated . Then the capacitance value obtained through the program again converted into a value of permittivity . LCD is used to display the values of capacitance and permittivity results based on calculations performed by the microcontroller.

Testing the system in measuring permittivity shows that the accuracy of the tools are designed differently in each type of material tested . Where the materials tested include glycerin with deviation of 3.4 % , alcohol 11.2 % , purified water 0.5 % , and palm oil 15 % . Measurements show the results though fickle in measuring fluid is not replaced . The level of accuracy obtained is very dependent on the performance of the program on the microcontroller frequency counter . The accuracy in measuring the dimensions of capacitive sensors also greatly affect the results of the calculation program .

**Keywords:** Permittivity, Capacitance, Microcontroller