

DCL-01

Dielectric Measurement Setup

Dielectric measurement of non-conducting liquids

- High Precision
- Smooth movement
- Accurate measurement
- Easy change of sample

Introduction

Dielectric or electrical insulating materials are the substances in which electrostatic field can persist for long times. When a dielectric is placed between the plates of a capacitor and the capacitor is charged, the electric field between the plates polarizes the molecules of the dielectric. This produces concentration of charge on its surface that creates an electric field which is antiparallel to the original field (which has polarized the dielectric). This reduces the electric potential difference between the plates. Considered in reverse, this means that, with a dielectric between the plates of a capacitor, it can hold a larger charge. The extent of this effect depends on the dipole polarizability of molecules of the dielectric, which in turn determines the dielectric constant of the material.

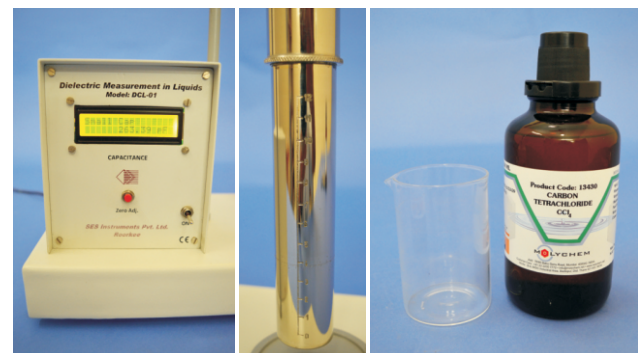
The method for determination of dielectric constants of liquids consists in the successive measurement of capacitance, first in a vacuum, and then when the capacitor is immersed in the liquid under investigation. A cylindrical capacitor has been used here.

Description of the Experiment Set-up

1. Probes Arrangement

It consists of two polished brass cylinders fixed coaxially with insulating gaskets at the two ends. These gaskets have holes, in the lower one for allowing the experimental liquid to flow in between the cylinders, and in the upper one for communication with the atmosphere. This arrangement is mounted vertically and can be moved up and down with a rack-and-pinion set-up. It is put in a vessel containing the experimental liquid. The outer surface of the outer cylinder has a vertical scale to measure the height of the liquid within the cylinders. Proper leads are provided for connection to the Capacitance Meter.

Sample : Carbon Tetra Chloride



2. Digital Capacitance Meter

This is a compact direct reading micro-controller based high resolution instrument for the measurement of capacitance of the sample.

Specification

Range	: 0pf – 50mf
Resolution	: 0.01pf
Display	: 16 x 2 LCD display with back light
Accuracy	: Better than 1%
Zero Setting	: Push button zero setting