

CAPACITIVE ELECTRICAL CONDUCTIVITY SENSOR INTEGRATED IN A WATER METER

ABSTRACT

A capacitive electrical conductivity sensor is integrated into a water meter. The sensor is used to determine water conductivity, which may be used to determine water quality. A model of a capacitor, a flow of water, and a plastic conduit used to conduct the flow of water passing through a water meter is defined. The model may include a circuit having a constant phase element (CPE) connected to a resistor R_b and a capacitor C_b in parallel. An input signal may be applied to the actual capacitor (not the model) over a range of frequencies. Current flow associated with several frequencies may be used to identify values of Q_0 and alpha of the CPE of the model. A value for the resistor R_b is identified using values obtained from measurements. A conductivity of the flow of water may be derived using input values comprising R_b , and the values of Q_0 and alpha of the CPE of the model.

FIG. 1