Liquid Dielectric Constant Meter
Model 871

■ Features

- Measurement of the dielectric constant from water to non-polar solvents
  Range 1～20, Range 1～200
- Very useful for the Mixtures
- Improvement for the calculation of Zeta Potential
- High accuracy: ±2%
- Simple to use
- Simple to clean with open structure of the probe
- Calibration with a liquid of known dielectric constant

With the new Model 871 the measurement of dielectric constants has been very easy. Insert the probe in the liquid to been measured, adjust the two controls on the front panel and read the dielectric constant from the display. The Model 871 can accurately measure in low and high dielectric solvents, including mixtures.

PRINCIPLES OF OPERATION

The Model 871 has two ranges: 1~20 and 1~200. Absolute accuracy is ± 2%, repeatability and linearity are better than ±0.2%. The measurement signal applied to the outer cylinder of the probe is a low-distortion sine wave at a frequency of 10 kHz. The amplitude is approximately 7 volts rms on the 1~20 range, and 0.7 volts on the 1~200. The frequency is crystal-controlled, and is therefore stable to approximately 1 part in 10^5. The dielectric constant of the liquid sample is measured by measuring the current between the outer cylinder and the inner cylinder of the probe. With a stable voltage source and precisely known probe parameters, it is possible to display the dielectric constant directly. Calibration is simple using the back panel adjustment with a liquid of known dielectric constant.

It is constructed from two precision cylinders, machined from type 316 stainless steel. The cylinder spacing is maintained by six nylon screws. If the probe is used primarily with low-dielectric constant hydrocarbon fluids, we recommend cleaning by agitation in acetone or ethyl alcohol, followed by gentle drying with clean compressed air. Any residue of the liquid left in the probe may affect measurement accuracy. If the probe is used to measure fluids with a particulate component, it is important that it be cleaned before any residue dries on the cylinders. We have found that the most efficient way to remove particulate matter is to immerse the probe in an ultrasonic cleaner with an appropriate solvent. Since the probe is made of stainless steel, nylon and teflon, it may be cleaned in almost any solvent. **It is important that the probe not be disassembled for cleaning.**

The accuracy of measurement is strongly

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dependent upon maintaining the geometry of the probe, which will unavoidably change with disassembly and reassembly.

■ Measurement for Common Liquid

● Pure liquid

Material	Measured Dielectric Constant	Tempe-rature	Published[1] Dielectric Constant	% Difference[2]
Cyclohexane	2.04	25.0℃	2.016	1.19
Toluene	2.37	24.5℃	2.375	-0.21
Ethanol	25.1	25.1℃	25.1	0.00
Methanol	32.9	24.0℃	32.77	0.40
Distilled Water	79.2	24.2℃	78.64	0.71
	78.3	24.2℃	78.64	-0.43
	80.3	21.7℃	79.54	0.96
● Mixtures				
Methanol＋Water (1:1)	61.5	25℃	N/A	‥‥

1. CRC Handbook of Chemistry and Physics

2. %Difference＝{Measured－Published)／Published}×100

■ Specifications

- Full Scale Sensitivity：1～20 and 1～200
- Accuracy：±2%
- Repeatability：±0.2%
- Linearity：±0.2%
- Maximum Conductivity of Sample：
  Range 1～ 20：1μS/cm
  Range 1～200：10μS/cm
  (<0.05 mM 1:1 electrolyte)
- Sample Volume：42 mL
- Operating Temperature：22～58℃
- Measurement Signal：Low-distortion 10 kHz sine wave, about 7 volts rms
- Display：LED
- Probe Materials：Stainless steel and teflon
- Output：Analog recorder.
  Full scale reading=1.999 volts
- Power：110/220 volts, 50/60 Hz, 10 watts
- Size：197(W)×250(D)×85(H) mm

Specifications and descriptions in this brochure subject to change without notice.

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