

Standards

USES:

- Reference Standard
- Working Standard
- Verification of Calibration of LCR Meters
- Capacitance Measurement Functions
- Verification of Calibration of Multimeters
- For Calibrating Instrumentation

FEATURES:

- Two and Three terminal calibration provided
- Available in 0.001 μ F, 0.01 μ F, 0.1 μ F, and 1.0 μ F
- +0.01%/year stability
- Calibration accuracy +0.02%



Series 1409 Capacitor

Reference Standard of Capacitance

Introduction

The 1409 Standard Capacitors are fixed mica capacitors of very high stability for use as two- or three-terminal reference or working standards in the laboratory.

Description

Typical capacitors, observed over more than 20 years, have shown random fluctuations of less than +0.01% in measured capacitance with no evidence of systematic drift.

These capacitor units consist of a silvered-mica and foil pile, spring-held in a heavy metal clamping structure for mechanical stability. The units are selected for low dissipation factor and are stabilized by heat cycling. They are housed, with silica gel to provide continuous desiccation, in cast aluminum cases, sealed with high-temperature potting wax. A well is provided in the wall of the case for the insertion of a dial-type thermometer. Three jack-top binding posts are provided on the top of the case and removable plugs on the bottom, for convenient parallel connection without error.

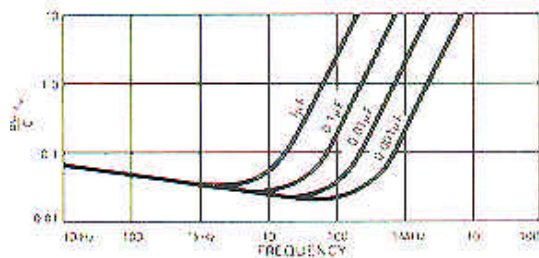


Figure 1

Change in capacitance as a function of frequency for typical 1409 Capacitors. The 1-kHz value on the plot should be used as a basis of reference in estimating frequency errors.

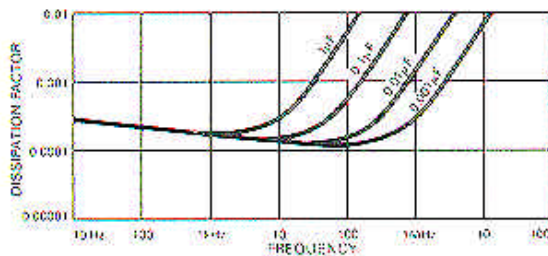


Figure 2

Dissipation factor as a function of frequency.

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& GenRad (General Radio)**

Series 1409 Capacitor

Calibration: A certificate of calibration is supplied with each capacitor, giving the both two- and three-terminal measured capacitances at 1kHz and at 23°±1°C. The measured value is the capacitance added when the standard is plugged directly into the binding posts. This value is obtained by comparison, to a precision better than +/- 0.01%, with working standards whose absolute values are known to an accuracy typically +/- 0.01%, determined and maintained in terms of reference standards periodically measured by the National Institute of Standards and Technology.

Adjustment Accuracy: Within +/- 0.5% of the nominal capacitance value (two terminal) marked on the case.

Stability: Capacitance change is less than 0.01% per year.

Temperature Coefficient of Capacitance:
+35 +/-10ppm / °C between 10°C and 70°C.

Dissipation Factor: Less than 0.0003 at 1kHz and 23° C (See Figure 2)
Measured dissipation factor at 1 kHz is stated in the certificate to an accuracy of +/-0.00005.

Series Inductance: 0.050µH for 1409-F and 1409-L
0.055µH for the 1409-T and 1409-Y

Series Resistance At 1MHz:
0.02Ω except for the 1409-Y, which is 0.03Ω

Frequency Characteristics:
See Figure 1. Series resistance varies as the square root of the frequency for frequencies above 100kHz.

Approximate Terminal Capacitance:
From H Terminal to case (G), 12 to 50pF.
From L Terminal (outside foils of capacitor) to case, 300 to 1300pF.

Leakage Resistance: 5000 ohm-farads or 100GΩ, whichever is less.

Maximum Voltage: 500V pk up to 10kHz.

Mechanical: Sealed Case.

Dimensions: (w x h x d): 1409-Y: 3.25 x 5.63 x 2.69in (83 x 143 x 69mm)
1409-F: 3.25 x 4 x 2in (83 x 102 x 51mm)
1409-L: 3.25 x 4 x 2in (83 x 102 x 51mm)
1409-T: 3.25 x 4 x 2in (83 x 102 x 51mm)

Weight: 1.25lb (0.6kg) net, 4lb(1.9kg) shipping ; the 1409-Y is heavier by approximately 1lb (0.5kg).

Ordering Information

Reference Standard Capacitor

Catalog Number	Item
1409-9706	1409-F, 0.001µF
1409-9712	1409-L, 0.01µF
1409-9720	1409-T, 0.1µF
1409-9725	1409-Y, 1.0µF

Includes:

Calibration Certificate Traceable to NIST

Optional Accessories:

Calibration Data



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