



MORE NEW CAPACITORS

In a recent¹ issue of the *EXPERIMENTER*, new designs for laboratory standard mica capacitors were announced. These design improvements are now extended to the less-precise, lower-priced TYPE 505 Capacitors and to the decade capacitors in which TYPE 505 Units are used. In the decade capacitors a new switch, and in the decade assemblies a redesigned cabinet, offer additional advantages.

TYPE 505 CAPACITORS

The silvered-mica electrodes and other improvements embodied in the new TYPE 1409 Standard Capacitors¹ are now available in the TYPE 505 Capacitors, and these units are now manufactured to new and considerably improved specifications of tolerance and dissipation factor. The capacitors are

¹Easton and McElroy, "New, Silvered Mica, Standard Capacitors, TYPE 1409," *General Radio Experimenter*, 32, 2, July, 1957.

Figure 2. Panel view of the Type 1419-K Decade Capacitor.

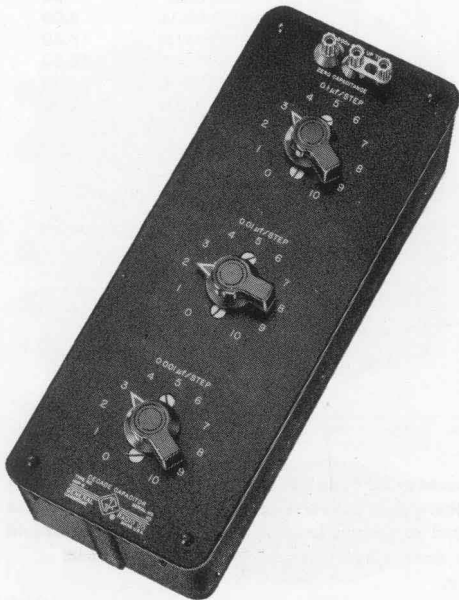


Figure 1. View of Type 505 Capacitors showing the two case sizes and the arrangement of terminals.

housed in low-loss molded-phenolic cases and are equipped with both screw- and plug-type terminals and with flanges for mounting. They are used both as laboratory "secondary standards" and as circuit elements in measuring equipment as, for example, in a number of General Radio bridges in the 1-percent-accuracy class.

Dissipation factor of these units, in the 1000- μf and higher sizes, does not exceed .0003. The losses in the phenolic case increase the dissipation factor slightly for units of 500 μf and smaller. Leakage resistance is 5000 megohm-microfarads or 100,000 megohms, whichever is the lower. The first figure represents the performance of the mica, while the second represents the phenolic case and is controlling below 0.05 μf .

The same high-quality silvered-mica sheets are used in the construction of the TYPE 505 Capacitors as are used in the TYPE 1409 Standard Capacitors. Accuracy of adjustment is $\pm 0.5\%$, in contrast to the 0.1% adjustment of the TYPE 1409. The lower accuracy and the less-expensive packaging result in a unit that sells at a price substantially lower than that of the 1409¹, but whose characteristics and stability are entirely adequate for many laboratory, production-line, and instrument applications.

SPECIFICATIONS

Accuracy: $\pm 0.5\%$ or $\pm 3\mu\mu\text{f}$, whichever is the larger.

Temperature Coefficient: Approximately $+0.0035\%$ per degree Centigrade between 10° and 50° Centigrade. Calibration is made at 23° C., at a frequency of 1 kc.

Dissipation Factor: 0.0003 for 1000 $\mu\mu\text{f}$ and higher; 500 $\mu\mu\text{f}$, 0.00035; 200 $\mu\mu\text{f}$, 0.0004; 100 $\mu\mu\text{f}$, 0.0006.

Frequency Characteristics: See plots below. Series inductance is approximately $0.055 \mu\text{h}$ for units in small case and $0.085 \mu\text{h}$ for large case. Series resistance at 1 Mc is approximately 0.03 ohm for small case and 0.05 ohm for large case, varying as square root of frequency above 100 kc.

Leakage Resistance: Greater than 100,000 megohms, when measured at 500 volts, except for the TYPES 505-T, 505-U, and 505-X, for which it is greater than 50,000, 25,000, and 10,000 megohms, respectively.

Maximum Voltage: See table. At higher frequencies the allowable voltage decreases and is inversely proportional approximately to the frequency. These limits correspond to a tem-

perature rise of 40° Centigrade for a power dissipation of 1 watt for the small case and 2.5 watts for the large case.

Terminals: Screw terminals spaced $\frac{3}{4}$ inch apart. Two TYPE 274-P Plugs are supplied with each capacitor. High terminal (inside foil) is marked H.

Mounting: Mica-filled, low-loss phenolic cases.

Dimensions: See sketch. Over-all height, $1\frac{5}{8}$ inches for large case, 1 inch for small case, exclusive of plugs.

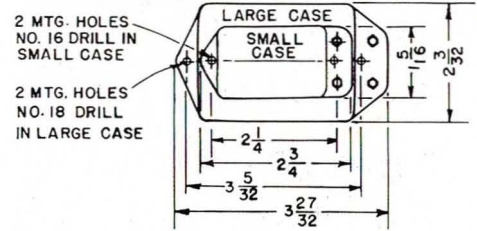


Figure 3. Dimension sketch of Type 505 Capacitors.

Type	Capacitance	Maximum Peak Volts	Frequency Limit for Max. Volts	Weight in Ounces	Code Word	Price
505-A	100 $\mu\mu\text{f}$	700	12Mc	4	CONDENALLY	\$ 8.00
505-B	200 $\mu\mu\text{f}$	700	7	4	CONDENBELL	6.50
505-E	500 $\mu\mu\text{f}$	500	3.5	4	CONDENCOAT	6.00
505-F	0.001 μf	500	2	4	CONDENDRAM	6.00
505-G	0.002 μf	500	1.1	5	CONDENEYRE	6.50
505-K	0.005 μf	500	500kc	5	CONDENFACT	6.50
505-L	0.01 μf	500	320	5	CONDENGIRL	8.50
505-M	0.02 μf	500	200	6	CONDENHEAD	9.00
*505-R	0.05 μf	500	100	11	CONDENCALM	13.50
*505-T	0.1 μf	500	50	12	CONDENCROW	16.50
*505-U	0.2 μf	500	25	13	CONDENWIPE	24.00
*505-X	0.5 μf	500	10	15	CONDENWILT	52.50

*Mounted in large case.

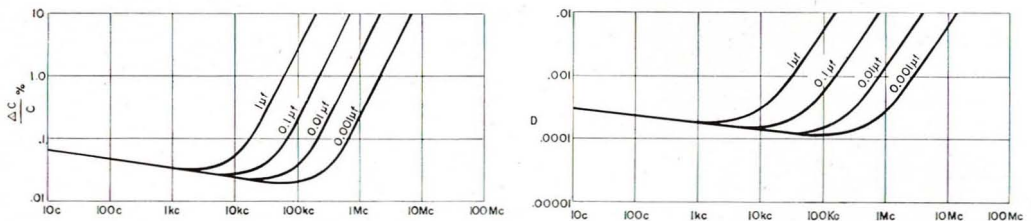


Figure 4. (Left) Change in capacitance as a function of frequency for Type 505 Capacitors. These changes are referred to the values which the capacitors would have if there were neither interfacial polarization nor series inductance. Since the capacitors are adjusted to their nominal values at 1 kc, the 1-kc value on the plot should be used as a basis of reference in estimating frequency errors. (Right) Dissipation factor as a function of frequency.