

**SPRAGUE**<sup>®</sup>

THE MARK OF RELIABILITY

a GK Technologies subsidiary

# Engineering Bulletin

**2705A**

Third Printing

## Type 259P and 260P Tubular Metal-Clad

### METFILM<sup>®</sup> 'K' CAPACITORS

**G**REAT VERSATILITY and superior electrical characteristics in small physical size are the prime attributes of Metfilm 'K' Capacitors.

The design of Type 259P and 260P Metfilm 'K' Capacitors takes full advantage of Sprague's long experience in the manufacture of high-quality metallized capacitors. The unusual properties of the metallized polycarbonate-film dielectric employed in Metfilm 'K' capacitors results in units with high insulation resistance, high stability, minimum capacitance change with temperature, low dielectric absorption, and low dissipation factor. The capacitor sections are effectively of non-inductive construction.

On a-c applications, it should be noted that a particularly advantageous property of the metallized polycarbonate-film dielectric is the essentially flat dissipation factor vs. temperature curve.

The low dissipation factor at moderate frequencies makes these capacitors especially suited for applications requiring high current capabilities, such as SCR commutating capacitors. Other applications for these capacitors include low-frequency tuned circuits, analog computer reference capacitors, and precision timing and integrating circuits.

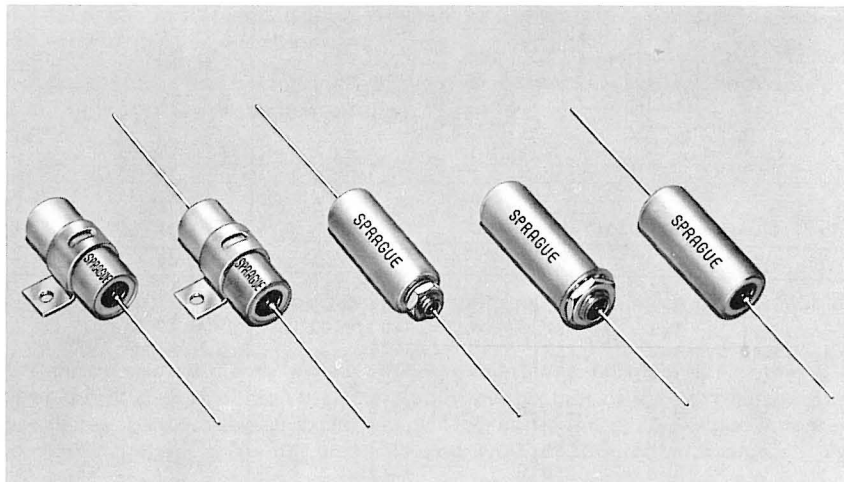
Another outstanding feature of Type 259P and 260P capa-

citators is their self-healing ability in the rare event of dielectric breakdown. The Metfilm 'K' capacitors described in this bulletin are hermetically-sealed in tubular cases with glass-to-metal solder-seal terminals.

Type 260P capacitors are designed for operation over the temperature range of  $-55\text{ C}$  to  $+105\text{ C}$  without voltage derating. Voltage ratings range from 200 WVDC to 600 WVDC.

Type 259P capacitors, are rated for operation up to  $85\text{ C}$  but may be operated up to  $105\text{ C}$  at 75% of the rated a-c voltage. They are available in ratings from 215 WVAC to 440 WVAC.

Standard capacitance tolerances are  $\pm 20\%$ ,  $\pm 10\%$ , and  $\pm 5\%$ , but tolerances as close as  $\pm 1\%$  are available on special order.



TYPE 259P AND 260P METFILM 'K' CAPACITORS ARE AVAILABLE IN A WIDE VARIETY OF MOUNTING ARRANGEMENTS TO MEET THE NEEDS OF EQUIPMENT DESIGNERS. TYPICAL CAPACITORS ARE SHOWN ABOVE.

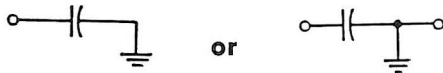
**SPRAGUE**ENGINEERING  
BULLETIN**2705A****SPRAGUE ELECTRIC COMPANY**

# TYPE 259P AND 260P CASE STYLES

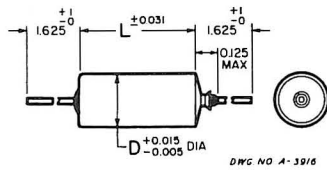
Leads are bare solid tinned wire. Lead wire sizes are:

Can Dia.	Lead AWG
.175 and .195	No. 24
.235	No. 22
.312	No. 20
.400 and over	No. 18

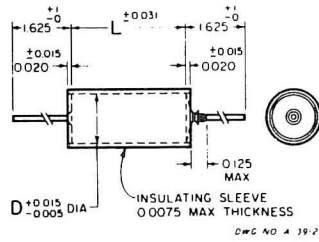
## Section Grounded to Case



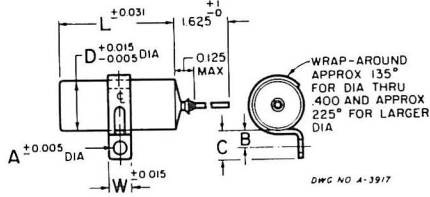
Style 1



Style 3



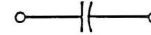
Style 12



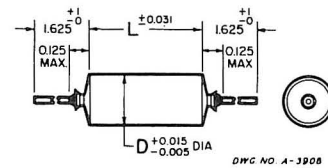
Bracket located ±0.031" of center line

D	W	A	B	C
.175	1/4	.144	.187	.312
.195	1/4	.144	.187	.312
.235	1/4	.144	.187	.312
.312	1/4	.144	.187	.312
.400	1/4	.144	.187	.312
} ±.015				
.562	1/2	.156	.250	.437
.670	1/2	.156	.250	.437
.750	1/2	.156	.250	.437
1.000	1/2	.156	.250	.437
} ±.031				

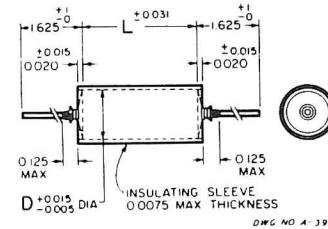
## Section Insulated from Case



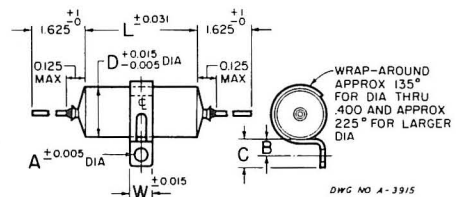
Style 2



Style 4



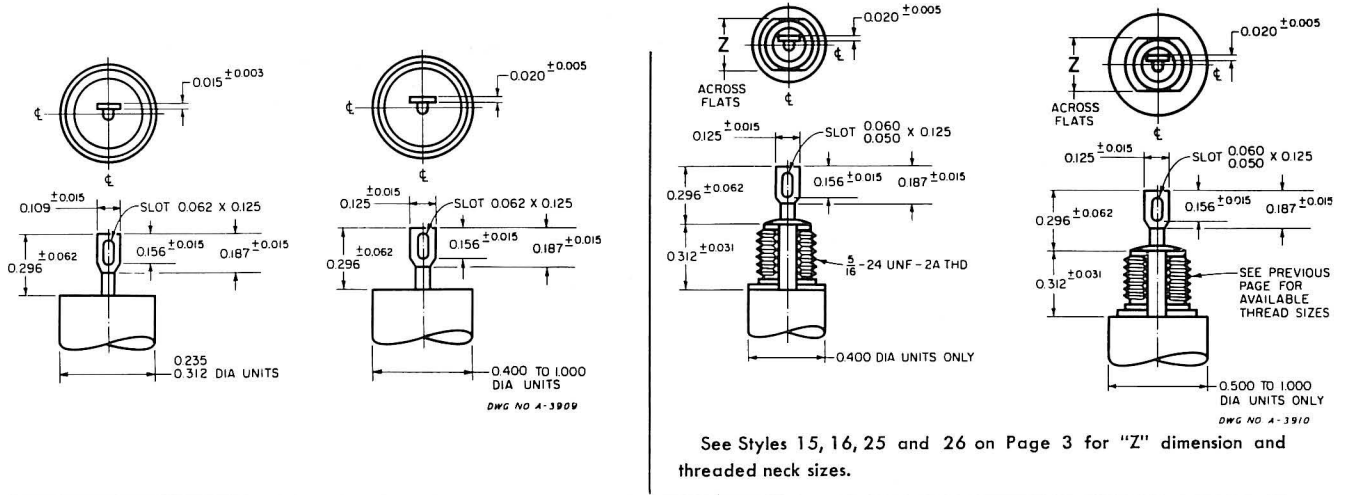
Style 13



Bracket located ±0.031" of center line

D	W	A	B	C
.175	1/4	.144	.187	.312
.195	1/4	.144	.187	.312
.235	1/4	.144	.187	.312
.312	1/4	.144	.187	.312
.400	1/4	.144	.187	.312
} ±.015				
.562	1/2	.156	.250	.437
.670	1/2	.156	.250	.437
.750	1/2	.156	.250	.437
1.000	1/2	.156	.250	.437
} ±.031				

## TYPICAL TAB TERMINAL DIMENSIONS



## 5% TOLERANCE UNITS AVAILABLE

For special circuit applications requiring very close tolerances on the nominal capacitance ratings,  $\pm 5\%$  units may be obtained. These can be made in any of the microfarad ratings in which 10% units are available, as well as in intermediate ratings falling between the regular  $\pm 10\%$  decade values.

The entire list of standard  $\pm 5\%$  decade values can be constructed by using the following table. Each pair of two digits in this table represents the significant figures of the capacitance rating.

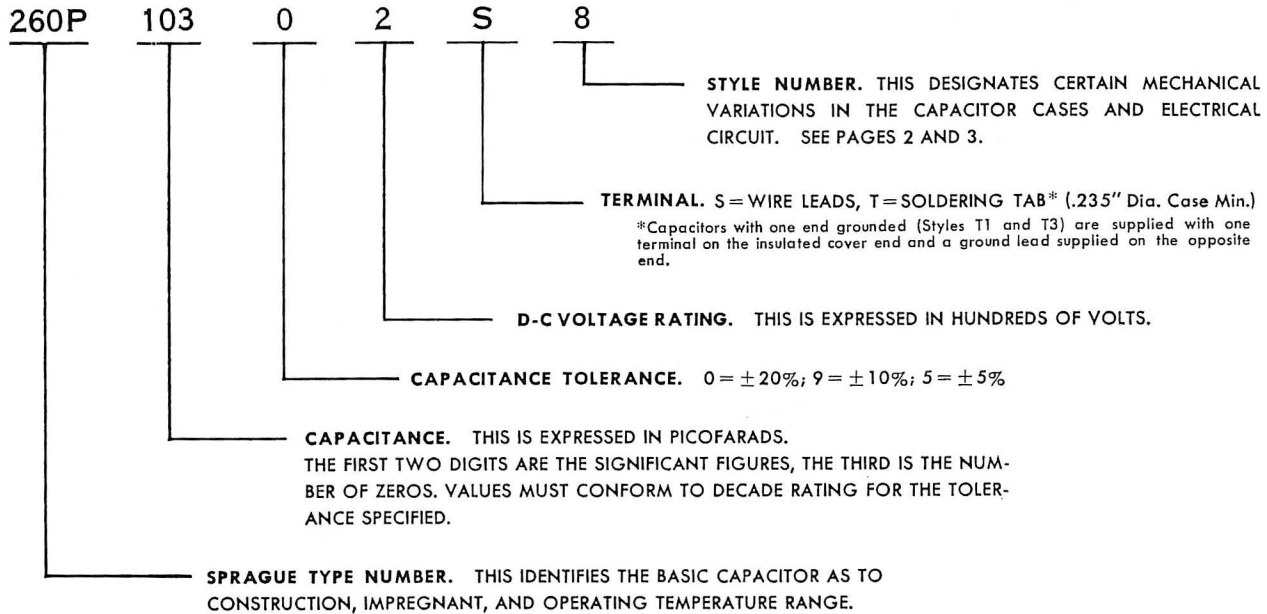
10	16	27	43	68
11	18	30	47	75
12	20	33	51	82
13	22	36	56	91
15	24	39	62	10

Five per cent units are available in the same range of capacitance and voltage ratings which are available for  $\pm 10\%$  and  $\pm 20\%$  units.

The first  $\pm 5\%$  value after a  $\pm 20\%$  decade value is, with few exceptions, available in the same size as the  $\pm 20\%$  unit. For the  $\pm 10\%$  decade value after a  $\pm 20\%$  value, the case size usually will be that of the next higher  $\pm 20\%$  value. For a  $\pm 5\%$  decade value preceding a  $\pm 20\%$  value, the case size will be that of the  $\pm 20\%$  value it precedes. Thus, a .91  $\mu\text{F}$ , 200 volt capacitor of a given type would be the same size as a 1.00  $\mu\text{F}$  200 volt capacitor.

Where required, Sprague is also in a position to furnish  $\pm 1\%$  and  $\pm 2\%$  tolerance units within the capacitance ranges shown on the following pages.

## Catalog Numbering System for Type 260P Capacitors



## TYPE 260P STANDARD D-C RATINGS

For a complete catalog number, the capacitance code numbers listed in the following table must be prefixed with the designation, 260P, to indicate the construction type desired, and must be followed by a style number selected from the available styles shown on pages 2 and 3. For example, 260P10302S3.

The tolerances allowed on the dimensions tabulated below are shown in the line drawings on pages 2 and 3, which illustrate the available case styles.

Note: For units larger than .562 by 1.812 mounting by means of the lead wires is not recommended.

μF	Size		Capacitance Code		μF	Size		Capacitance Code	
	D	L*	±20% Tol.	±10% Tol.		D	L*	±20% Tol.	±10% Tol.
<b>200 VOLTS D-C</b>					<b>200 VOLTS D-C (Cont.)</b>				
0.01	0.175	.687	10302	10392	0.1	0.312	.812	10402	10492
0.012	0.195	.687		12392	0.12	0.312	1.062		12492
0.015	0.195	.687	15302	15392	0.15	0.312	1.062	15402	15492
0.018	0.235	.687		18392	0.18	0.400	.812		18492
0.022	0.235	.687	22302	22392	0.22	0.400	.812	22402	22492
0.027	0.235	.687		27392	0.27	0.400	1.062		27492
0.033	0.235	.687	33302	33392	0.33	0.400	1.062	33402	33492
0.039	0.312	.812		39392	0.39	0.400	1.312		39492
0.047	0.312	.812	47302	47392	0.47	0.400	1.312	47402	47492
0.056	0.312	.812		56392	0.56	0.562	1.062		56492
0.068	0.312	.812	68302	68392	0.68	0.562	1.062	68402	68492
0.082	0.312	.812		82392	0.82	0.562	1.312		82492

\*Add 1/16" to Listed "L" Dimension for Length of Styles with Both Terminals Insulated from Case. (Styles 2, 4, 13.)

## STANDARD RATINGS - continued

μF	Size		Capacitance Code		μF	Size		Capacitance Code	
	D	L*	±20% Tol.	±10% Tol.		D	L*	±20% Tol.	±10% Tol.
<b>200 VOLTS D-C (Cont.)</b>					<b>400 VOLTS D-C (Cont.)</b>				
1.0	0.562	1.312	10502	10592	0.033	0.312	1.062	33304	33394
2.0	0.670	1.562	20502	20592	0.039	0.312	1.062		39394
2.5	0.670	1.812	25502	25592	0.047	0.312	1.062	47304	47394
3.0	0.750	1.812	30502	30592	0.056	0.400	1.062		56394
4.0	0.750	2.062	40502	40592	0.068	0.400	1.062	68304	68394
5.0	0.750	2.312	50502	50592	0.082	0.400	1.312		82394
7.0	1.000	1.812	70502	70592	0.1	0.400	1.312	10404	10494
8.0	1.000	2.062	80502	80592	0.12	0.500	1.062		12494
9.0	1.000	2.312	90502	90592	0.15	0.500	1.062	15404	15494
10.0	1.000	2.562	10602	10692	0.18	0.562	1.312		18494
<b>300 VOLTS D-C</b>					<b>500 VOLTS D-C</b>				
0.01	0.235	.687	10303	10393	0.01	0.312	.812	10305	10395
0.012	0.312	.812		12393	0.012	0.312	.812		12395
0.015	0.312	.812	15303	15393	0.015	0.312	.812	15305	15395
0.018	0.312	.812		18393	0.018	0.312	1.062		18395
0.022	0.312	.812	22303	22393	0.022	0.312	1.062	22305	22395
0.027	0.312	.812		27393	0.027	0.312	1.062		27395
0.033	0.312	.812	33303	33393	0.033	0.312	1.062	33305	33395
0.039	0.312	.812		39393	0.039	0.400	1.062		39395
0.047	0.312	.812	47303	47393	0.047	0.400	1.062	47305	47395
0.056	0.312	1.062		56393	0.056	0.400	1.312		56395
0.068	0.312	1.062	68303	68393	0.068	0.400	1.312	68305	68395
0.082	0.400	1.062		82393	0.082	0.500	1.062		82395
0.1	0.400	1.062	10403	10493	0.1	0.500	1.062	10405	10495
0.12	0.400	1.312		12493	0.12	0.562	1.312		12495
0.15	0.400	1.312	15403	15493	0.15	0.562	1.312	15405	15495
0.18	0.500	1.062		18493	0.18	0.562	1.562		18495
0.22	0.500	1.062	22403	22493	0.22	0.562	1.562	22405	22495
0.27	0.562	1.062		27493	0.27	0.670	1.562		27495
0.33	0.562	1.062	33403	33493	0.33	0.670	1.562	33405	33495
0.39	0.562	1.312		39493	0.39	0.750	1.812		39495
0.47	0.562	1.312	47403	47493	0.47	0.750	1.812	47405	47495
0.56	0.562	1.812		56493	0.56	0.750	2.062		56495
0.68	0.562	1.812	68403	68493	0.68	0.750	2.062	68405	68495
0.82	0.670	1.812		82493	0.82	1.000	1.812		82495
1.0	0.670	1.812	10503	10593	1.0	1.000	1.812	10505	10595
2.0	0.750	2.312	20503	20593					
2.5	0.750	2.562	25503	25593					
3.0	1.000	1.812	30503	30593					
4.0	1.000	2.312	40503	40593					
<b>400 VOLTS D-C</b>									
0.01	0.312	.812	10304	10394					
0.012	0.312	.812		12394					
0.015	0.312	.812	15304	15394					
0.018	0.312	.812		18394					
0.022	0.312	.812	22304	22394					
0.027	0.312	1.062		27394					

\*Add 1/16" to Listed "L" Dimension for Length of Styles with Both Terminals Insulated from Case. (Styles 2, 4, 13.)

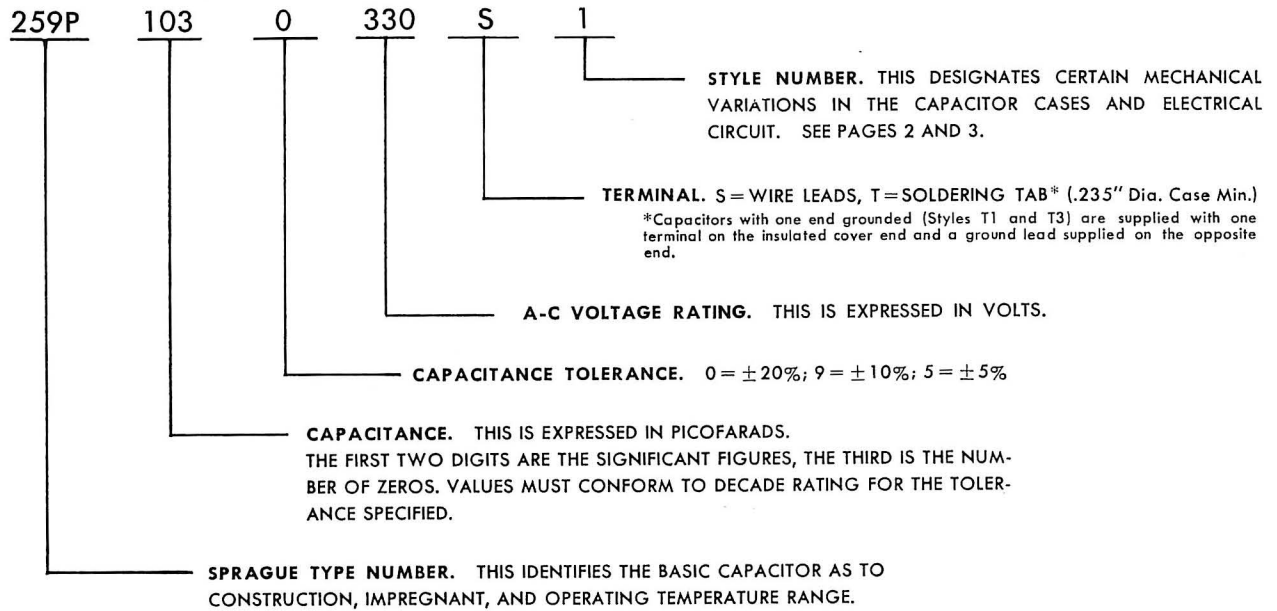
## STANDARD RATINGS - Continued

μF	Size		Capacitance Code		μF	Size		Capacitance Code	
	D	L	±20% Tol.	±10% Tol.		D	L	±20% Tol.	±10% Tol.
<b>600 VOLTS D-C</b>					<b>600 VOLTS D-C (Cont.)</b>				
0.01	0.312	.812	10306	10396	0.12	0.562	1.562		12496
0.012	0.400	1.062		12396	0.15	0.562	1.562	15406	15496
0.015	0.400	1.062	15306	15396	0.18	0.670	1.562		18496
0.018	0.400	1.062		18396					
0.022	0.400	1.062	22306	22396	0.22	0.670	1.562	22406	22496
0.027	0.400	1.062		27396	0.27	0.750	1.812		27496
0.033	0.400	1.062	33306	33396	0.33	0.750	1.812	33406	33496
0.039	0.400	1.312		39396	0.39	0.750	2.312		39496
0.047	0.400	1.312	47306	47396	0.47	0.750	2.312	47406	47496
0.056	0.562	1.062		56396	0.56	1.000	1.812		56496
0.068	0.562	1.062	68306	68396	0.68	1.000	1.812	68406	68496
0.082	0.562	1.312		82396	0.82	1.000	2.312		82496
0.1	0.562	1.312	10406	10496	1.0	1.000	2.312	10506	10596

## INCH TO MILLIMETER CONVERSION

0.0030 in	0.076 mm	0.175 in	4.445 mm	0.468 in	11.91 mm	1.250 in	31.75 mm
0.0050	0.127	0.187	4.750	0.484	12.29	1.312	33.35
0.0075	0.191	0.195	4.953	0.500	12.70	1.375	34.93
0.015	0.381	0.250	5.207	0.562	14.27	1.562	39.70
0.016	0.406	0.235	5.969	0.625	15.88	1.625	41.28
0.020	0.508	0.255	6.477	0.670	17.02	1.812	46.05
0.022	0.559	0.281	7.137	0.687	17.48	1.875	47.63
0.031	0.787	0.296	7.518	0.703	17.86	2.062	52.40
0.035	0.889	0.312	7.925	0.718	18.26	2.125	53.98
0.050	1.270	0.344	8.738	0.750	19.05	2.312	58.75
0.060	1.524	0.354	8.992	0.796	20.24	2.375	60.32
0.062	1.575	0.375	9.525	0.812	20.65	2.562	65.10
0.109	2.769	0.380	9.652	0.828	21.03	2.625	66.68
0.120	3.048	0.400	10.16	0.875	22.23		
0.125	3.175	0.406	10.31	1.000	25.40		
0.144	3.658	0.437	11.10	1.062	27.00		
0.156	3.962	0.439	11.13	1.125	28.58		

# Catalog Numbering System for Type 259P Capacitors



## TYPE 259P STANDARD A-C RATINGS

For a complete catalog number, the capacitance code numbers listed in the following table must be prefixed with the designation, 259P, to indicate the construction type desired, and must be followed by a style number selected from the available styles shown on pages 2 and 3. For example, 259P10330S3.

The tolerances allowed on the dimensions tabulated below are shown in the line drawings on pages 2 and 3, which illustrate the available case styles.

Note: For units larger than .562 by 1.812 mounting by means of the lead wires is not recommended.

$\mu\text{F}$	LOW VOLTAGE SERIES					HIGH VOLTAGE SERIES				
	Size		400 Hz	Capacitance Code	Capacitance Code	Size		400 Hz	Capacitance Code	Capacitance Code
	D	L	Volts RMS at 85 C			D	L	Volts RMS at 85 C		
	VOLTAGE RATING CODE (See Figure 2, page 10)					VOLTAGE RATING CODE (See Figure 3, page 10)				
0.01	0.312	0.812	330	1030330	1039330	0.312	1.062	440	1030440	1039440
0.012	0.400	0.812	330		1239330	0.400	1.062	440		1239440
0.015	0.400	0.812	330	1530330	1539330	0.400	1.062	440	1530440	1539440
0.018	0.400	0.812	330		1839330	0.400	1.062	440		1839440
0.022	0.400	0.812	330	2230330	2239330	0.400	1.062	440	2230440	2239440
0.027	0.400	1.062	330		2739330	0.400	1.312	440		2739440
0.033	0.400	1.062	330	3330330	3339330	0.400	1.312	440	3330440	3339440
0.039	0.400	1.062	330		3939330	0.562	1.062	440		3939440
0.047	0.400	1.062	330	4730330	4739330	0.562	1.062	440	4730440	4739440
0.056	0.400	1.312	330		5639330	0.562	1.312	440		5639440
0.068	0.400	1.312	330	6830330	6839330	0.562	1.312	440	6830440	6839440
0.082	0.500	1.062	330		8239330	0.562	1.562	440		8239440
0.1	0.500	1.062	330	1040330	1049330	0.562	1.562	440	1040440	1049440
0.12	0.562	1.312	330		1249330	0.670	1.562	435		1249435
0.15	0.562	1.312	330	1540330	1549330	0.670	1.562	435	1540435	1549435
0.18	0.562	1.562	330		1849330	0.670	1.812	430		1849430
0.22	0.562	1.562	330	2240330	2249330	0.670	1.812	430	2240430	2249430
0.27	0.562	1.812	330		2749330	0.750	2.312	425		2749425
0.33	0.562	1.812	330	3340330	3349330	0.750	2.312	425	3340425	3349425
0.39	0.670	1.562	330		3949330	1.000	1.812	410		3949410
0.47	0.670	1.562	330	4740330	4749330	1.000	1.812	410	4740410	4749410
0.56	0.750	1.812	320		5649320	1.000	2.312	390		5649390
0.68	0.750	1.812	320	6840320	6849320	1.000	2.312	390	6840390	6849390
0.82	0.750	2.062	300		8249300					
1.0	0.750	2.062	300	1050300	1059300					
1.5	1.000	1.812	265	1550265	1559265					
2.2	1.000	2.562	215	2250215	2259215					

\*Add 1/16" to Listed "L" Dimension for Length of Styles with Both Terminals Insulated from Case. (Styles 2, 4, 13.)



## PERFORMANCE CHARACTERISTICS

### 1. Operating Temperature Range.

**1.1 Type 260P.** These capacitors are designed to operate over a temperature range of  $-55^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$ .

**1.2 Type 259P.** These capacitors are designed to operate at full rated voltage over the temperature range of  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

**1.2.1** For operation at  $+105^{\circ}\text{C}$ , the voltage ratings of these capacitors is 75% of the  $85^{\circ}\text{C}$  rating.

### 2. Insulation Resistance.

**2.1 At  $25^{\circ}\text{C}$ .** The minimum product of insulation resistance and capacitance shall be 50,000 megohms-microfarads.

**2.1.1** However, in no case need the insulation resistance exceed 100,000 megohms.

**2.1.2** Where the case is not a terminal, the insulation resistance between the case and either terminal shall be at least 50,000 megohms.

**2.2 At  $85^{\circ}\text{C}$ .** The minimum product of insulation resistance and capacitance shall be 10,000 megohms-microfarads.

**2.2.1** However, in no case need the insulation resistance exceed 50,000 megohms.

**2.3 At  $105^{\circ}\text{C}$ .** The minimum product of insulation resistance and capacitance shall be 2000 megohm-microfarads.

**2.3.1** However, in no case need the insulation resistance exceed 10,000 megohms.

**2.4 Type 260P.** Measurements shall be made after a two minute charge at the rated d-c voltage or 500 volts d-c, whichever is less.

**2.5 Type 259P.** Measurements shall be made after a two minute charge at 400 volts d-c.

**3. Capacitance and Tolerance.** The capacitance of all capacitors shall be within the specified tolerance limits of the nominal rating.

**3.1** Capacitors shall be measured at a frequency of 1kHz at  $25^{\circ}\text{C}$ , or else referred to measurements made at that frequency and temperature.

**4. Dissipation Factor.** The maximum dissipation factor of capacitors shall be 0.3% at  $25^{\circ}\text{C}$  except that capacitors in 0.235" diameter cases and smaller may have a maximum dissipation factor of 0.6%.

**4.1** Capacitors shall be measured at a frequency of 1kHz or else referred to measurements made at that frequency.

### 5. Voltage Test.

**5.1** Capacitors shall withstand a d-c potential of twice the rated voltage, applied between the terminals for two minutes maximum, without permanent breakdown.

**5.1.1** When the case is not a terminal, the capacitors shall withstand for two minutes twice rated d-c voltage applied between the case and the terminals connected together.

**5.2** Capacitors shall withstand an a-c potential of 1.4 times the rated a-c voltage, applied between the terminals for a period of two minutes maximum, without permanent breakdown.

**5.2.1** When the case is not a terminal, the capacitors shall withstand for two minutes 1.4 times the rated a-c voltage applied between the case and the terminals connected together.

**5.3** The test voltage must be applied and discharged through a resistor of one ohm per volt.

**6. D-C Life Test.** Capacitors shall withstand a d-c test potential of 125% of rated voltage between terminals, or between terminals and case, if the case is a terminal, for a period of 250 hours at  $105^{\circ}\text{C}$ .

**6.1** The life test voltage must be applied and discharged through a resistor of one ohm per volt.

**6.2** Not more than one failure shall be permitted in 12 units tested. Failure shall be considered to be any one of the following:

#### 6.2.1 Terminal to Terminal.

- (a) A change in capacitance of more than 2% of the capacitance before life test for capacitors in 0.312" diameter cases and larger or 5% of the capacitance before life test for capacitors in 0.235" diameter cases and smaller.
- (b) A change in insulation resistance times capacitance product to less than 5000 megohm-microfarads at  $25^{\circ}\text{C}$ .
- (c) A drop in insulation resistance to less than 25,000 megohms with the requirements of section 2.1.1 originally applied.
- (d) An increase in dissipation factor to more than 0.5% for capacitors in 0.312" diameter cases and above or 1% for capacitors in 0.235" diameter cases and smaller.

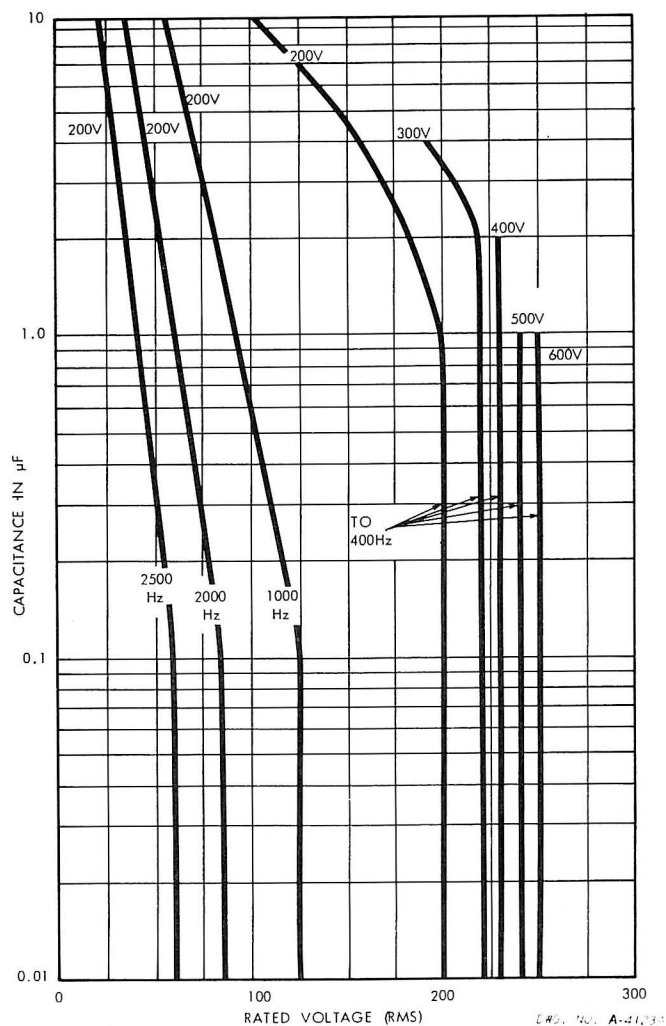


**PERFORMANCE CHARACTERISTICS - Continued**

**6.2.2 Terminal to Case.**

- (a) When the case is not a terminal, a drop in insulation resistance between case and either terminal to less than 25,000 megohms at 25 C.

**7. A-C Operation.** Rated a-c voltage for all standard d-c ratings is shown in Figure 1.



**FIGURE 1—TYPE 260P**

A-C VOLTAGE RATINGS AT 85 C AMBIENT TEMPERATURE AS A FUNCTION OF CAPACITANCE.

AT 105 C AMBIENT TEMPERATURE, DERATE TO 75%.

**7.1 Superimposed A-C.** In no case should the sum of the d-c and peak a-c voltage applied to a capacitor exceed the rated d-c voltage at the maximum operating temperature except as permitted by Figure 1.

**7.2** Rated a-c voltage for Type 259P special a-c ratings is shown in Figures 2 and 3.

PERFORMANCE CHARACTERISTICS - Continued

Low Voltage Series - Type 259P

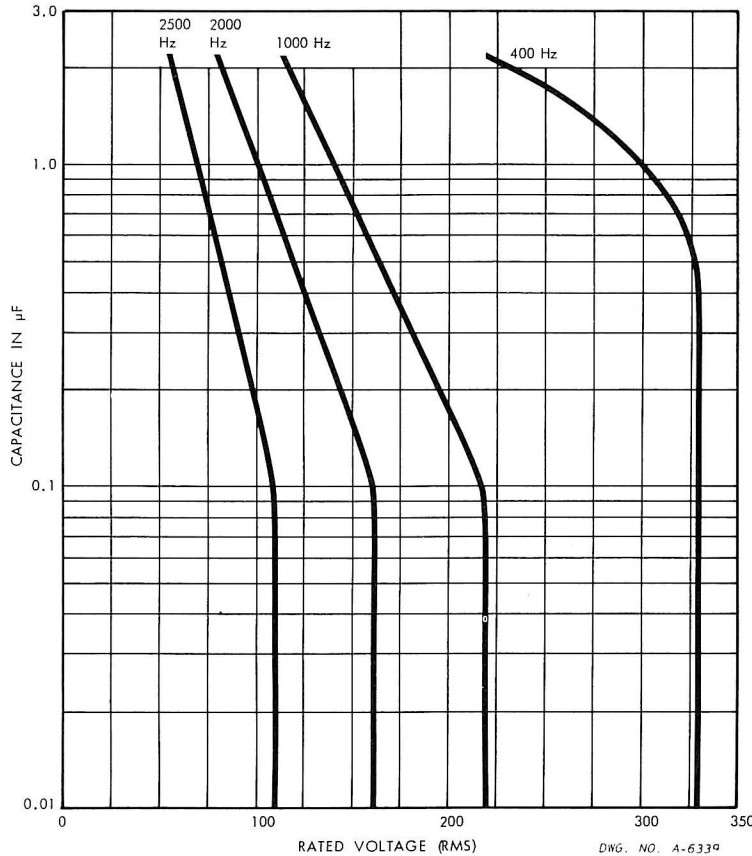


FIGURE 2

A-C VOLTAGE RATINGS AT 85 C AMBIENT TEMPERATURE AS A FUNCTION OF CAPACITANCE.

AT 105 C AMBIENT TEMPERATURE, DERATE TO 75%.

**8. A-C Life Test.** Capacitors shall withstand an a-c potential of 110% of the rated 400 Hz a-c voltage for a period of 250 hours at +85 C.

**8.1** Not more than one failure shall be permitted in 12 units tested. Failure shall be considered to be any one of the following:

**8.1.1 Terminal to Terminal.**

- (a) A change in capacitance value of greater than 5% of the capacitance value before test.
- (b) A change in insulation resistance times capacitance product to less than 5,000 megohm-microfarads at 25 C.
- (c) A drop in insulation resistance to less than 25,000 megohms with the requirements of section 2.1.1 originally applied.
- (d) An increase in dissipation factor to more than 0.5% for capacitors in 0.312" diameter cases and above or 1% for capacitors in 0.235" diameter cases and smaller.

High Voltage Series - Type 259P

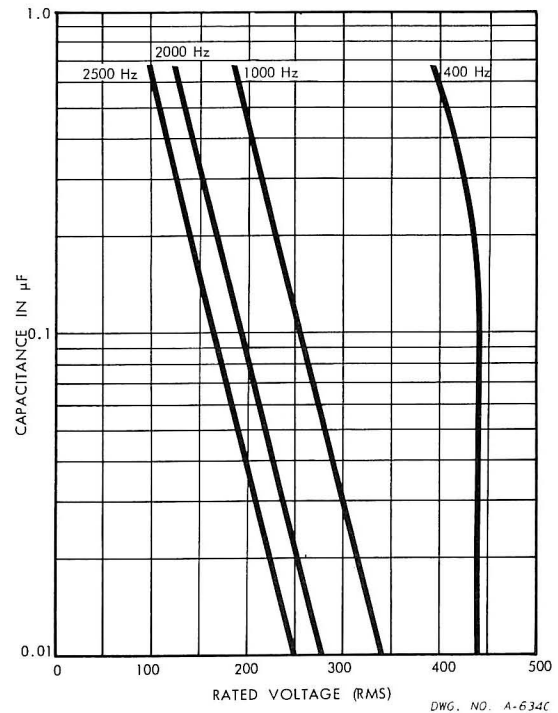


FIGURE 3

A-C VOLTAGE RATINGS AT 85 C AMBIENT TEMPERATURE AS A FUNCTION OF CAPACITANCE.

AT 105 C AMBIENT TEMPERATURE, DERATE TO 75%.

**8.1.2 Terminal to Case.**

- (a) When the case is not a terminal, a drop in insulation resistance between case and either terminal to less than 25,000 megohms at 25 C.

**9. Temperature and Immersion Cycling.** These capacitors shall meet the temperature and immersion cycling tests of Military Specification MIL-C-18312.

**10. Moisture Resistance.** These capacitors shall meet the moisture resistance tests of Military Specification MIL-C-18312.

**11. Vibration.**

**11.1** All capacitors shown in this bulletin shall withstand the 55 cycle vibration test in accordance with MIL-STD-202, Method 201.

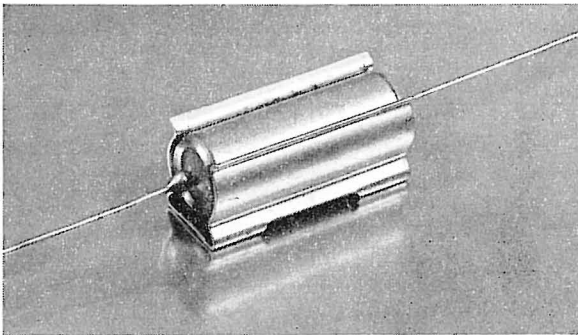
PERFORMANCE CHARACTERISTICS - Continued

11.2 Style 1, 2, 3, 4, 12, and 13 capacitors shall withstand 2000 cycle vibration test at 15g in accordance with MIL-STD-202A, method 204, test condition B provided supplementary mounting is used for Styles 1, 2, 3, and 4.

12. **Pull Test.** These capacitors shall withstand a steady pull of 5 pounds applied axially to the leads for one minute.

13. **Lead Bending Test.** Wire leads shall withstand without breakage bending about the point of egress from the capacitor first 90° in one direction, then back to the original position and then 90° in the opposite direction.

Application Notes

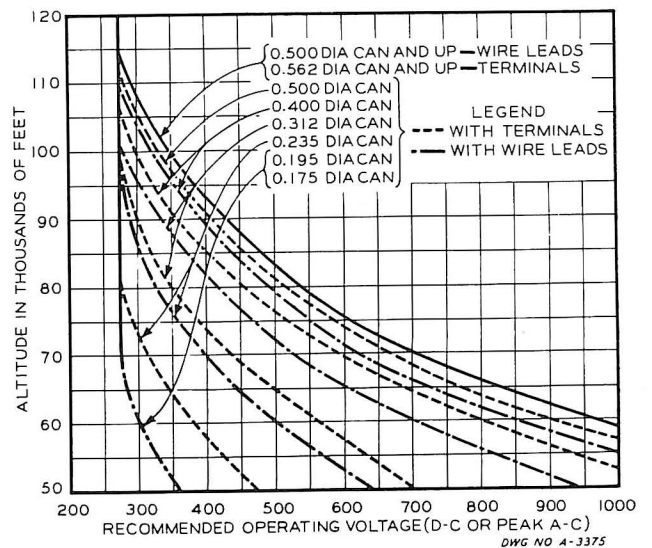


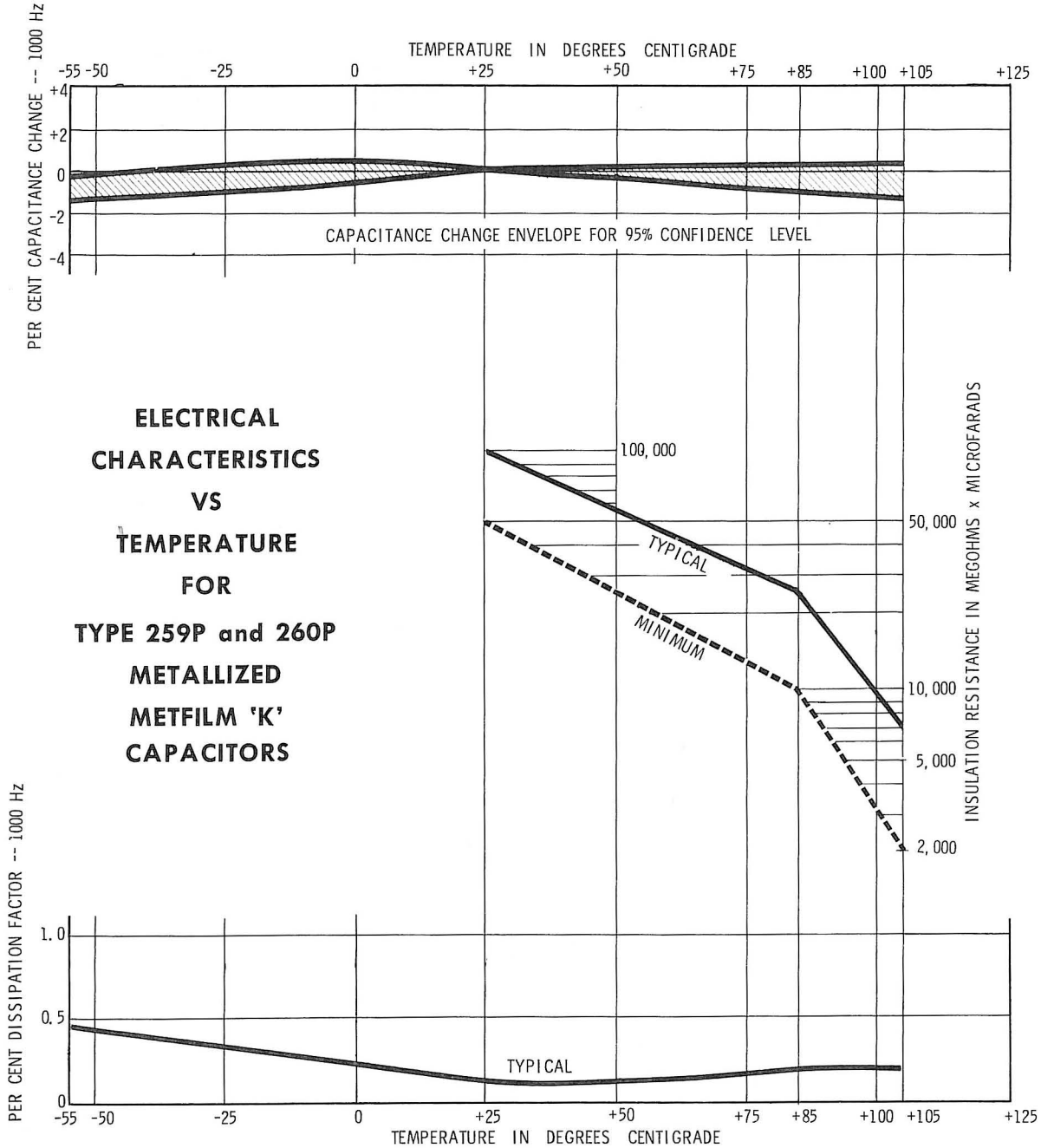
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**Mounting.** Tubular capacitors should be mounted such that the leads are not required to withstand forces arising from the mass of the capacitor body where shock or high frequency vibration is likely to be encountered. The necessity for exercising great care in the use of a strap or clamp is emphasized. A clamp which pinches the body too tightly may injure it, either because of the stress produced in tightening or because of the aggravation of these stresses by vibration.

There are available, however, clamps designed to support capacitors subject to shock and vibration. Typical of these is the spring clip shown in the above photograph.

**Altitude Limitations.** Capacitor bushing flashover voltage limitations should be taken into consideration when designing circuits for use in guided missiles and similar high altitude applications. The curves below give typical maximum voltages which should be taken into consideration when using Type 259P and 260P Metfilm 'K' Capacitors in electronic equipment. From the practical standpoint these curves indicate that it may sometimes be necessary to specify a higher working voltage capacitor in a larger diameter case in order to insure satisfactory operation of the finished equipment.





DWG. NO. U-1061

In the construction of the components described, the full intent of the specification will be met. The Sprague Electric Company, however, reserves the right to make, from time to time, such departures from the detail specifications as may be required to permit improvements in the design of its products. Components made under military approvals will be in accordance with the approval requirements.

The information included herein is believed to be accurate and reliable. However, the Sprague Electric Company assumes no responsibility for its use; nor for any infringements of patents or other rights of third parties which may result from its use.

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