

## Metallized Polyester Film Capacitor Related Document: IEC 60384-2

**MAIN APPLICATIONS:**

Blocking, bypassing, filtering, timing, coupling and decoupling circuits, interference suppression in low voltage applications. High temperature operations.

**MARKING:**

Manufacturer's logo/type/C-Value/rated voltage/tolerance/date of manufacture

**DIELECTRIC:**

Polyester film

**ELECTRODES:**

Vacuum deposited aluminum

**COATING:**

Flame retardant plastic case (UL-class 94 V-0), green, epoxy resin sealed

**CONSTRUCTION:**

Extended metallized film (refer to general information)

**LEADS:**

Tinned wire

**IEC TEST CLASSIFICATION:**

55/125/56, according to IEC 60068

**TEMPERATURE RANGE:**

- 55°C to + 125°C

**CAPACITANCE RANGE:**

1000pF to 15µF

**CAPACITANCE TOLERANCES:**

± 20% (M), ± 10% (K), ± 5% (J)

**RATED VOLTAGES (U<sub>R</sub>):**

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC

**PERMISSIBLE AC VOLTAGES (RMS) UP TO 60Hz:**

40 VAC, 63 VAC, 160 VAC, 200 VAC, 220 VAC, 220 VAC

**TEST VOLTAGE (ELECTRODE/ELECTRODE):**

1.6 x U<sub>R</sub> for 2 s

**INSULATION RESISTANCE:**

Measured at 100 VDC (63 VDC series measured at 50 VDC) after one minute

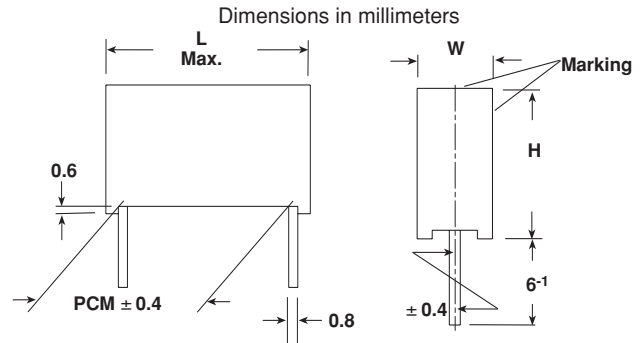
**MAXIMUM PULSE RISE TIME**

| PCM<br>(mm) | Maximum Pulse Rise Time d <sub>v</sub> /d <sub>t</sub> [V/µs] |         |         |         |         |          |
|-------------|---|---------|---------|---------|---------|----------|
|             | 63 VDC  | 100 VDC | 250 VDC | 400 VDC | 630 VDC | 1000 VDC |
| 10          | 6   | 9       | 18      | 26      | 35      | 130      |
| 15          | 4   | 5       | 10      | 16      | 33      | 65       |
| 22.5        | 2.5   | 3       | 6       | 9       | 19      | 34       |
| 27.5        | —   | 2.5     | 5       | 7       | 14      | 25       |

If the maximum pulse voltage is less than the rated voltage higher d<sub>v</sub>/d<sub>t</sub> values can be permitted.

**DISSIPATION FACTOR TAN δ**

| MEASURED AT | C ≤ 0.1µF             | 0.1µF < C ≤ 1.0µF     | C > 1.0µF             |
|-------------|-----------------------|-----------------------|-----------------------|
| 1kHz        | 8 x 10 <sup>-3</sup>  | 8 x 10 <sup>-3</sup>  | 10 x 10 <sup>-3</sup> |
| 10kHz       | 15 x 10 <sup>-3</sup> | 15 x 10 <sup>-3</sup> | —                     |
| 100kHz      | 25 x 10 <sup>-3</sup> | —                     | —                     |
|             |                       | Maximum values        |                       |



**For C ≤ 0.33µF and U<sub>R</sub> > 100 VDC:**  
30,000 MΩ minimum value (100,000 MΩ typical value)  
**For C ≤ 0.33µF and U<sub>R</sub> ≤ 100 VDC:**  
15,000 MΩ minimum value (50,000 MΩ typical value)

**TIME CONSTANT:**

Measured at 100 VDC (63 VDC series measured at 50 VDC) after one minute

**For C > 0.33µF and U<sub>R</sub> > 100 VDC:**  
10,000 s minimum value (40,000 s typical value)

**For C > 0.33µF and U<sub>R</sub> ≤ 100 VDC:**  
5000 s minimum value (15,000 s typical value)

**CAPACITANCE DRIFT:**

Up to + 40°C, ± 1.5% for a period of two years

**DERATING FOR DC AND AC. CATEGORY VOLTAGE U<sub>C</sub>:**

At + 85°C: U<sub>C</sub> = 1.0 U<sub>R</sub>

At + 100°C: U<sub>C</sub> = 0.8 U<sub>R</sub>

At + 125°C: U<sub>C</sub> = 0.5 U<sub>R</sub> (maximum 1000 h)

**SELF INDUCTANCE:**

~ 6 nH measured with 2mm long leads

**PULL TEST ON LEADS:**

≥ 30 N in direction of leads according to IEC 60068-2-21

**RELIABILITY:**

Operational life > 300,000 h

Failure rate < 2 FIT (40°C and 0.5 x U<sub>R</sub>)

For further details, please refer to the general information provided in this catalog.



| CAPACITANCE | CAPACITANCE CODE | VOLTAGE CODE 06<br>63 VDC/40 VAC |      |      |      | VOLTAGE CODE 01<br>100 VDC/63 VAC |      |      |      | VOLTAGE CODE 25<br>250 VDC/160 VAC |      |      |      |
|-------------|------------------|----------------------------------|------|------|------|-----------------------------------|------|------|------|------------------------------------|------|------|------|
|             |                  | W                                | H    | L    | PCM  | W                                 | H    | L    | PCM  | W                                  | H    | L    | PCM  |
| 1000 pF     | - 210            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 1500 pF     | - 215            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 2200 pF     | - 222            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 3300 pF     | - 233            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 4700 pF     | - 247            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 6800 pF     | - 268            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 0.01 μF     | - 310            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 0.015 μF    | - 315            | —                                | —    | —    | —    | —                                 | —    | —    | —    | —                                  | —    | —    | —    |
| 0.022 μF    | - 322            | —                                | —    | —    | —    | —                                 | —    | —    | —    | 3.5                                | 8.0  | 13.0 | 10   |
| 0.033 μF    | - 333            | —                                | —    | —    | —    | —                                 | —    | —    | —    | 3.5                                | 8.0  | 13.0 | 10   |
| 0.047 μF    | - 347            | —                                | —    | —    | —    | —                                 | —    | —    | —    | 3.5                                | 8.0  | 13.0 | 10   |
| 0.068 μF    | - 368            | —                                | —    | —    | —    | 3.5                               | 8.0  | 13.0 | 10   | 3.5                                | 8.0  | 13.0 | 10   |
| 0.10 μF     | - 410            | —                                | —    | —    | —    | 3.5                               | 8.0  | 13.0 | 10   | 4.5                                | 9.5  | 13.0 | 10   |
| 0.15 μF     | - 415            | —                                | —    | —    | —    | 3.5                               | 8.0  | 13.0 | 10   | 5.5                                | 10.5 | 13.0 | 10   |
| 0.22 μF     | - 422            | 3.5                              | 8.0  | 13.0 | 10   | 3.5                               | 8.0  | 13.0 | 10   | 6.5                                | 11.5 | 13.0 | 10   |
| 0.33 μF     | - 433            | 3.5                              | 8.0  | 13.0 | 10   | 4.0                               | 9.0  | 13.0 | 10   | 5.5                                | 10.5 | 18.0 | 15   |
| 0.47 μF     | - 447            | 3.5                              | 8.0  | 13.0 | 10   | 4.5                               | 9.5  | 13.0 | 10   | 6.5                                | 12.5 | 18.0 | 15   |
| 0.68 μF     | - 468            | 4.0                              | 9.0  | 13.0 | 10   | 5.5                               | 10.5 | 13.0 | 10   | 7.5                                | 13.5 | 18.0 | 15   |
| 1.0 μF      | - 510            | 4.5                              | 9.5  | 13.0 | 10   | 5.5                               | 10.5 | 18.0 | 15   | 8.5                                | 14.5 | 18.0 | 15   |
| 1.5 μF      | - 515            | 5.5                              | 10.5 | 13.0 | 10   | 6.5                               | 12.5 | 18.0 | 15   | 8.5                                | 16.5 | 26.5 | 22.5 |
| 2.2 μF      | - 522            | 6.5                              | 11.5 | 13.0 | 10   | 6.5                               | 12.5 | 18.0 | 15   | 10.5                               | 18.5 | 26.5 | 22.5 |
| 3.3 μF      | - 533            | 6.5                              | 12.5 | 18.0 | 15   | 8.5                               | 14.5 | 18.0 | 15   | 12.5                               | 20.0 | 26.5 | 22.5 |
| 4.7 μF      | - 547            | 7.5                              | 13.5 | 18.0 | 15   | 7.5                               | 15.5 | 26.5 | 22.5 | 13.5                               | 23.5 | 31.5 | 27.5 |
| 6.8 μF      | - 568            | 8.5                              | 14.5 | 18.0 | 15   | 8.5                               | 16.5 | 26.5 | 22.5 | —                                  | —    | —    | —    |
| 10.0 μF     | - 610            | 8.5                              | 17.5 | 18.0 | 15   | 10.5                              | 18.5 | 26.5 | 22.5 | —                                  | —    | —    | —    |
| 15.0 μF     | - 615            | 8.5                              | 16.5 | 26.5 | 22.5 | 11.5                              | 20.5 | 31.5 | 27.5 | —                                  | —    | —    | —    |

Further values upon request.

**RECOMMENDED PACKAGING**

| LETTER CODE | TYPE OF PACKAGING | HEIGHT (H)<br>(mm) | REEL DIAMETER<br>(mm) | ORDERING CODE EXAMPLES | PCM | PCM | PCM         |
|-------------|-------------------|--------------------|-----------------------|------------------------|-----|-----|-------------|
|             |                   |                    |                       |                        | 10  | 15  | 22.5 - 27.5 |
| D           | AMMO              | 16.5               | S*                    | MKT 1820-422/065-D     | X   | X   | —           |
| G           | AMMO              | 18.5               | S*                    | MKT 1820-422/065-G     | X   | X   | —           |
| F           | REEL              | 16.5               | 350                   | MKT 1820-422/065-F     | X   | X   | —           |
| W           | REEL              | 18.5               | 350                   | MKT 1820-422/065-W     | X   | X   | —           |
| V           | REEL              | 18.5               | 500                   | MKT 1820-610/015-V     | —   | X   | X           |
| G           | AMMO              | 18.5               | L*                    | MKT 1820-610/015-G     | —   | —   | X           |
| —           | BULK              | —                  | —                     | MKT 1820-615/015       | X   | X   | X           |

\*S = box size 55 x 210 x 340mm (W x H x L)

\*L = box size 60 x 360 x 510mm (W x H x L)



| CAPACITANCE | CAPACITANCE CODE | VOLTAGE CODE 40<br>400 VDC/200 VAC |      |      |      | VOLTAGE CODE 63*<br>630 VDC/220 VAC |      |      |      | VOLTAGE CODE 10*<br>1000 VDC/220 VAC |      |      |      |
|-------------|------------------|------------------------------------|------|------|------|-------------------------------------|------|------|------|--------------------------------------|------|------|------|
|             |                  | W                                  | H    | L    | PCM  | W                                   | H    | L    | PCM  | W                                    | H    | L    | PCM  |
| 1000 pF     | - 210            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 4.0                                  | 9.0  | 13.0 | 10   |
| 1500 pF     | - 215            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 4.0                                  | 9.0  | 13.0 | 10   |
| 2200 pF     | - 222            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 4.0                                  | 9.0  | 13.0 | 10   |
| 3300 pF     | - 233            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 4.0                                  | 9.0  | 13.0 | 10   |
| 4700 pF     | - 247            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 5.5                                  | 10.5 | 13.0 | 10   |
| 6800 pF     | - 268            | —                                  | —    | —    | —    | 3.5                                 | 8.0  | 13.0 | 10   | 6.5                                  | 11.5 | 13.0 | 10   |
| 0.01 µF     | - 310            | 3.5                                | 8.0  | 13.0 | 10   | 4.0                                 | 9.0  | 13.0 | 10   | 5.5                                  | 10.5 | 18.0 | 15   |
| 0.015 µF    | - 315            | 3.5                                | 8.0  | 13.0 | 10   | 4.5                                 | 9.5  | 13.0 | 10   | 6.5                                  | 12.5 | 18.0 | 15   |
| 0.022 µF    | - 322            | 3.5                                | 8.0  | 13.0 | 10   | 5.5                                 | 10.5 | 13.0 | 10   | 7.5                                  | 13.5 | 18.0 | 15   |
| 0.033 µF    | - 333            | 4.0                                | 9.0  | 13.0 | 10   | 5.5                                 | 10.5 | 18.0 | 15   | 6.5                                  | 14.5 | 26.5 | 22.5 |
| 0.047 µF    | - 347            | 4.5                                | 9.5  | 13.0 | 10   | 6.5                                 | 12.5 | 18.0 | 15   | 7.5                                  | 15.5 | 26.5 | 22.5 |
| 0.068 µF    | - 368            | 5.5                                | 10.5 | 13.0 | 10   | 7.5                                 | 13.5 | 18.0 | 15   | 8.5                                  | 16.5 | 26.5 | 22.5 |
| 0.10 µF     | - 410            | 6.5                                | 11.5 | 13.0 | 10   | 6.5                                 | 14.5 | 26.5 | 22.5 | 10.5                                 | 18.5 | 26.5 | 22.5 |
| 0.15 µF     | - 415            | 6.5                                | 12.5 | 18.0 | 15   | 7.5                                 | 15.5 | 26.5 | 22.5 | 11.5                                 | 20.5 | 31.5 | 27.5 |
| 0.22 µF     | - 422            | 6.5                                | 12.5 | 18.0 | 15   | 8.5                                 | 16.5 | 26.5 | 22.5 | 13.5                                 | 23.5 | 31.5 | 27.5 |
| 0.33 µF     | - 433            | 7.5                                | 13.5 | 18.0 | 15   | 11.5                                | 20.5 | 31.5 | 27.5 | 16.5                                 | 29.5 | 31.5 | 27.5 |
| 0.47 µF     | - 447            | 8.5                                | 17.5 | 18.0 | 15   | 11.5                                | 20.5 | 31.5 | 27.5 | 20.0                                 | 35.0 | 31.5 | 27.5 |
| 0.68 µF     | - 468            | 8.5                                | 16.5 | 26.5 | 22.5 | 13.5                                | 23.5 | 31.5 | 27.5 | —                                    | —    | —    | —    |
| 1.0 µF      | - 510            | 10.5                               | 18.5 | 26.5 | 22.5 | 15.0                                | 24.5 | 31.5 | 27.5 | —                                    | —    | —    | —    |
| 1.5 µF      | - 515            | 11.5                               | 20.5 | 31.5 | 27.5 | —                                   | —    | —    | —    | —                                    | —    | —    | —    |
| 2.2 µF      | - 522            | 13.5                               | 23.5 | 31.5 | 27.5 | —                                   | —    | —    | —    | —                                    | —    | —    | —    |

Further C-values upon request.

\*Not suitable for mains applications.

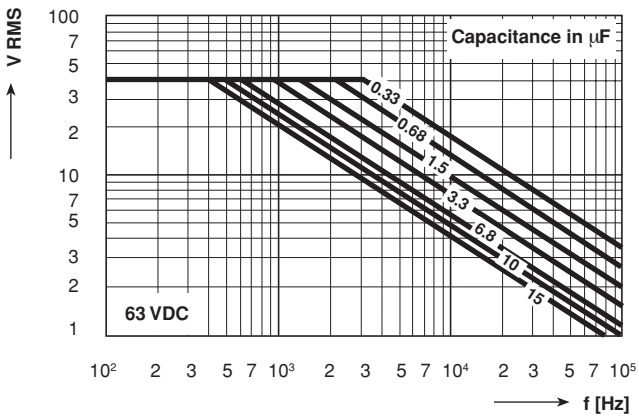
Please refer to X-capacitors in our catalog "RFI Suppression Components".

**RECOMMENDED PACKAGING**

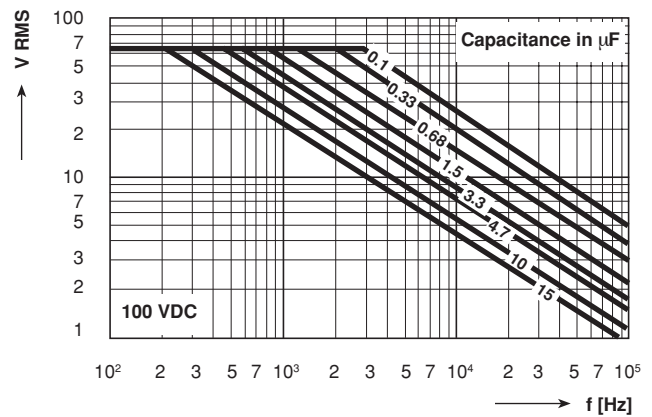
| LETTER CODE | TYPE OF PACKAGING | HEIGHT (H)<br>(mm) | REEL DIAMETER<br>(mm) | ORDERING CODE EXAMPLES | PCM | PCM | PCM         |
|-------------|-------------------|--------------------|-----------------------|------------------------|-----|-----|-------------|
|             |                   |                    |                       |                        | 10  | 15  | 22.5 - 27.5 |
| D           | AMMO              | 16.5               | S*                    | MKT 1820-410/405-D     | X   | X   | —           |
| G           | AMMO              | 18.5               | S*                    | MKT 1820-410/405-G     | X   | X   | —           |
| F           | REEL              | 16.5               | 350                   | MKT 1820-410/405-F     | X   | X   | —           |
| W           | REEL              | 18.5               | 350                   | MKT 1820-410/405-W     | X   | X   | —           |
| V           | REEL              | 18.5               | 500                   | MKT 1820-422/635-V     | —   | X   | X           |
| G           | AMMO              | 18.5               | L*                    | MKT 1820-422/635-G     | —   | —   | X           |
| —           | BULK              | —                  | —                     | MKT 1820-515/405       | X   | X   | X           |

\*S = box size 55 x 210 x 340mm (W x H x L)

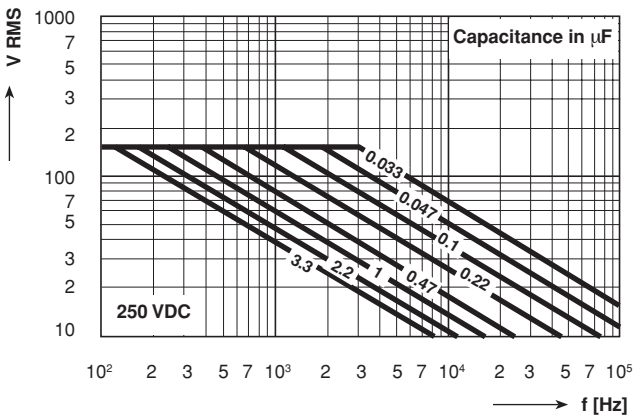
\*L = box size 60 x 360 x 510mm (W x H x L)



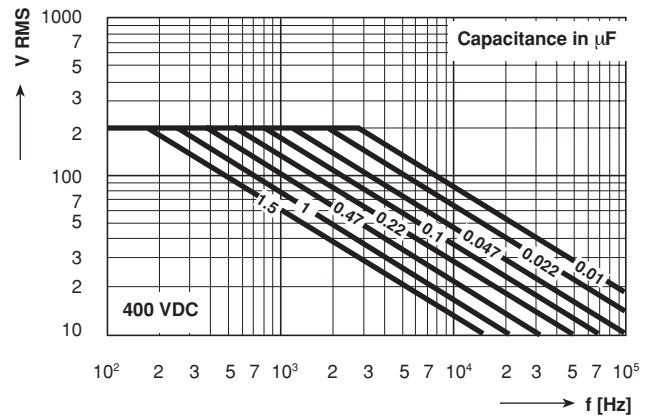
Permissible AC Voltage versus Frequency



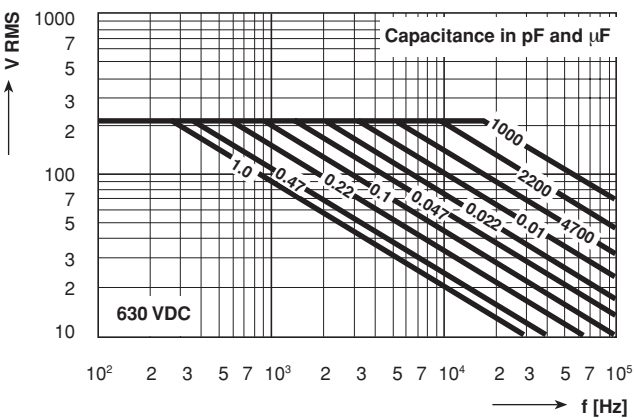
Permissible AC Voltage versus Frequency



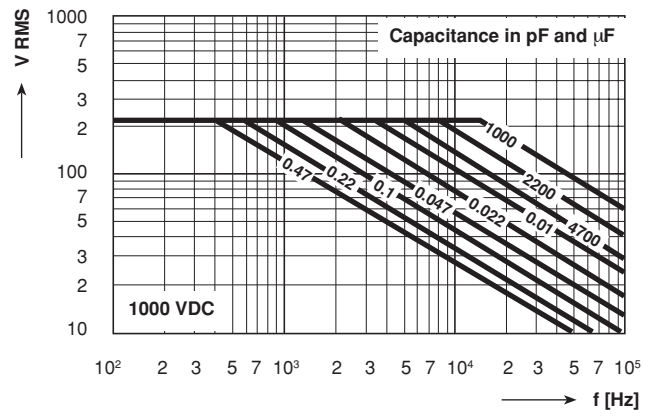
Permissible AC Voltage versus Frequency



Permissible AC Voltage versus Frequency



Permissible AC Voltage versus Frequency



Permissible AC Voltage versus Frequency