

Ø d ±0.05	p ≤ 15	22.5 ≤ p ≤ 27.5	p = 37.5
	0.6 or 0.8*	0.8	1

\*See size table.  
All dimensions are in mm.

**GENERAL TECHNICAL DATA**

- Dielectric:** polypropylene film.
- Plates:** metal layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** plastic case, thermosetting resin filled.  
Box material is solvent resistant and flame retardant according to UL94 V0.
- Marking:** Manufacturer's logo, series, capacitance, tolerance, rated voltage, capacitor class, dielectric code, climatic category, passive flammability category, manufacturing date code, approvals, manufacturing plant.

**Climatic category:** 40/110/56 IEC 60068-1  
**Operating temperature range:** -40 to +110°C  
**Related documents:** IEC 60384-14, EN 60384-14.

**ELECTRICAL CHARACTERISTICS**

**Rated voltage (V<sub>R</sub>):** 275Vac (50/60Hz) / 560 Vdc  
300Vac (50/60Hz) / 630 Vdc

**Capacitance range:** 0.01µF to 10µF  
**Capacitance values:** E6 series (IEC 60063 Norm).  
**Capacitance tolerances** (measured at 1 kHz):  
±10% (K); ±20% (M);  
tolerance ±5% (J) available upon request

**Dissipation factor (DF):**  
tgδ 10<sup>-4</sup> at +25°C ±5°C: ≤10 (6)\* at 1kHz  
\* Typical value

**Insulation resistance:**  
**Test conditions**  
Temperature: +25°C±5°C  
Voltage charge time: 1 min  
Voltage charge: 100 Vdc

**Performance**  
≥1x10<sup>5</sup> MΩ (5x10<sup>5</sup> MΩ)\* for C≤0.33µF  
≥30000 s (150000 s)\* for C>0.33µF  
\* Typical value

**Test voltage between terminations** (on all pieces):  
1500Vac for 1 s + 2200Vdc for 1 s at +25°C±5°C

X2 CLASS (IEC 60384-14) - MKP Series  
**METALLIZED POLYPROPYLENE FILM CAPACITOR**  
**SELF-HEALING PROPERTIES**

**Typical applications:** interference suppression and «across-the-line» applications. Suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.

PRODUCT CODE: **R46**

**Note:** R.46 series has replaced the 1.40 series and 1.47 series.  
For new design we suggest the use of the R.46 series.

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
10.0	All	B +0.2	H +0.1	L +0.2
15.0	<7.5	B +0.2	H +0.1	L +0.3
15.0	≥7.5	B +0.2	H +0.1	L +0.5
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

**TEST METHOD AND PERFORMANCE**

**Damp heat, steady state:**

**Test conditions 1st**  
Temperature: +40°C ± 2°C  
Relative humidity (RH): 93% ±2%  
Test duration: 56 days

**Test conditions 2nd**  
Temperature: +60°C ± 2°C  
Relative humidity (RH): 95% ±2%  
Test duration: 500 hours

**Performance**  
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
Capacitance change |ΔC/C|: ≤5%  
Insulation resistance: ≥50% of initial limit.

**Endurance:**

**Test conditions**  
Temperature: +110°C ± 2°C  
Test duration: 1000 h  
Voltage applied: 1.25 x V<sub>R</sub> +1000Vac 0.1 s/h

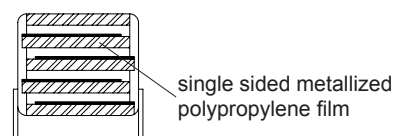
**Performance**  
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
Capacitance change |ΔC/C|: ≤10%  
Insulation resistance: ≥50% of initial limit.

**Resistance to soldering heat:**

**Test conditions**  
Solder bath temperature: +260°C ± 5°C  
Dipping time (with heat screen): 10 s ± 1 s

**Performance**  
Capacitance change |ΔC/C|: ≤2%

**Winding scheme**





X2 CLASS (IEC 60384-14) - MKP Series  
**METALLIZED POLYPROPYLENE FILM CAPACITOR**  
 SELF-HEALING PROPERTIES

**APPROVALS**

	ENEC IEC 60384-14	Class X2	File No.V4413
	CSA E 384-14 (up to 5.6µF)	Across-the-line	File No.154612 (LR 83890) in progress
	UL 1414 (up to 1µF, 85°C; 250Vac)	Across-the-line	File No.E97797 in progress
	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238
	GB/T 14472	Class X2	File CQC3001008199 CQC3001008842

Approved according to IEC 60384-14 (ex-former EN 132400)  
 According to IEC 60065

(\*\*) ENEC mark has replaced all the following European National marks:



Rated Cap.	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number	
	B	H	L	p				
0.033 µF	4.0	9.0	13.0	10.0	0.6	500	R46 KF	2330 -- P0 -
0.047 µF	4.0	9.0	13.0	10.0	0.6	500	R46 KF	2470 -- P0 -
0.068 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	2680 -- P0 -
0.1 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	3100 -- P1 M
0.1 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	3100 -- P0 -
0.15 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	3150 -- P0 M
0.15 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	3150 -- P0 -
0.22 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3220 -- P0 -
0.33 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3330 -- P0 -
0.33 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3330 -- P1
0.33 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3330 -- P2 -
0.47 µF	8.5	14.5	18.0	15.0	0.6	400	R46 KI	3470 -- P0
0.47 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3470 -- P1 M
0.47 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3470 -- P2 M
0.47 µF	7.5	18.5	18.0	15.0	0.8	400	R46 KI	3470 -- P3 -
0.68 µF	10.0	16.0	18.0	15.0	0.8	400	R46 KI	3680 -- P1 M
0.68 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3680 -- P0 -
0.82 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3820 -- P0 M
0.47 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3470 -- P1 -
0.56 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3560 -- P1 M
0.56 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3560 -- P0 -
0.68 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3680 -- P0 -
1.0 µF	8.5	17.0	26.5	22.5	0.8	200	R46 KN	4100 -- P1 M
1.0 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4100 -- P0 -
1.5 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4150 -- P1 M
1.5 µF	11.0	20.0	26.5	22.5	0.8	200	R46 KN	4150 -- P0 -
2.2 µF	13.0	22.0	26.5	22.5	0.8	200	R46 KN	4220 -- P0 M
1.0 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	4100 -- P0 -
1.5 µF	11.0	20.0	32.0	27.5	0.8	150	R46 KR	4150 -- P0 -
2.2 µF	13.0	22.0	32.0	27.5	0.8	150	R46 KR	4220 -- P0 -
3.3 µF	14.0	28.0	32.0	27.5	0.8	150	R46 KR	4330 -- P0 -
4.7 µF	14.0	28.0	32.0	27.5	0.8	150	R46 KR	4470 -- P1 M
4.7 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4470 -- P0 -
6.8 µF	22.0	37.0	32.0	27.5	0.8	150	R46 KR	4680 -- P0 -
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4220 -- P0 -
3.3 µF	13.0	24.0	41.5	37.5	1.0	100	R46 KW	4330 -- P0 -
4.7 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4470 -- P0 -
6.8 µF	19.0	32.0	41.5	37.5	1.0	100	R46 KW	4680 -- P0 -
10.0 µF	20.0	40.0	41.5	37.5	1.0	100	R46 KW	5100 -- P0 -

Rated voltage (K=275Vac)  
 Mechanical version and packaging (Table 1)  
 Tolerance: K (±10%); M (±20%)

Table 1

Standard packaging style	Lead length (mm)	Taping style			Ordering code (Digit 10 to 11)
		P <sub>2</sub> (mm)	Fig. (No.)	Pitch (mm)	
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø500mm		12.70	1	10.0/15.0	CK
REEL Ø500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 <sup>+2</sup>				00
Loose, long leads	25 <sup>-1/+2</sup>				50
Loose, long leads	30 <sup>+5</sup>				40
Loose, insulated rigid leads	30 <sup>+5</sup>				51
Loose, insulated flexible leads	150 <sup>±5</sup>				52

Note: Ammo-pack is the preferred packaging for taped version.

For "capacitor connected in serial with main line" (two - phase and three - phase net) application, please read the "SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS" at pag. 152 and contact our Technical Service for choosing the safest solution.

All dimensions are in mm

E12 Series available upon request

X2 CLASS (IEC 60384-14) - MKP Series METALLIZED POLYPROPYLENE FILM CAPACITOR SELF-HEALING PROPERTIES

APPROVALS

Table with columns for certification marks (ENEC, CSA, UL, GB/T), standards (IEC 60384-14, UL 1414, etc.), classes (Class X2), and file numbers.

Approved according to IEC 60384-14 (ex-former EN 132400) According to IEC 60065

(\*\*) ENEC mark has replaced all the following European National marks:



Main product specification table with columns: Rated Cap., 300 Vac / 630 Vdc Std dimensions (B, H, L, p), Ø d, Max dv/dt at 390Vdc (V/µs), and Part Number.

Rated voltage (3=300Vac) Mechanical version and packaging (Table 1) Tolerance: K (±10%); M (±20%)

Table 1

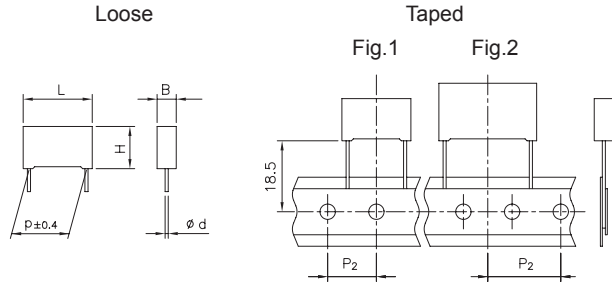
Table 1: Standard packaging style, Lead length (mm), Taping style (P2, Fig., Pitch), and Ordering code (Digit 10 to 11).

Note: Ammo-pack is the preferred packaging for taped version.

All dimensions are in mm

E12 Series available upon request

For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 152 and contact our Technical Service for choosing the safest solution.



X2 CLASS (IEC 60384-14) - MKP  
METALLIZED POLYPROPYLENE FILM CAPACITOR  
SELF-HEALING PROPERTIES

**Typical applications:** interference suppression and «across-the-line» applications. Suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.

PRODUCT CODE: R46

NEW 125°C

Ø d ±0.05	p ≤ 15	p = 22.5
	0.6 or 0.8*	0.8

\*See size table.  
All dimensions are in mm.

GENERAL TECHNICAL DATA

- Dielectric:** polypropylene film.
- Plates:** metal layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94 V0.
- Marking:** Manufacturer's logo, series, capacitance, tolerance, rated voltage, capacitor class, dielectric code, climatic category, passive flammability category, manufacturing date code, approvals, manufacturing plant.
- Climatic category:** 40/125/56 IEC 60068-1
- Operating temperature range:** -40 to +125°C
- Related documents:** IEC 60384-14; EN 60384-14

ELECTRICAL CHARACTERISTICS

- Rated voltage (V<sub>R</sub>):** 275 Vac (50/60Hz) / 560 Vdc
- Capacitance range:** 0.01µF to 1µF

TEST METHOD AND PERFORMANCE

- Endurance:**
  - Test conditions**
    - Temperature: +125°C±2°C
    - Test duration: 1000 h
    - Voltage applied: 1.25 x V<sub>R</sub> +1000Vac 0.1 s/h
  - Performance**
    - Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min
    - Capacitance change |ΔC/C|: ≤ 10%
    - Insulation resistance: ≥ 50% of initial limit.

APPROVALS

	ENEC IEC 60384-14	Class X2	File No.CA08.00063
	CSA E 384-14-95	Across-the-line	File No.154612 (LR83890)
	UL 1414 up to 1µF, 85°C; 250Vac	Across-the-line	File No.E97797
	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238

Approved according to IEC 60384-14 (ex-former EN 132400)  
According to IEC 60065  
(\*\*) ENEC mark has replaced all the following European National marks:



Rated Cap.	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number
	B	H	L	p			
0.010 µF	5.0	11.0	13.0	10.0	0.6	500	R46 K F 2100 -- H1 -
0.015 µF	5.0	11.0	13.0	10.0	0.6	500	R46 K F 2150 -- H1 -
0.022 µF	5.0	11.0	13.0	10.0	0.6	500	R46 K F 2220 -- H1 -
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46 K F 2330 -- H1 -
0.047 µF	6.0	12.0	13.0	10.0	0.6	500	R46 K F 2470 -- H1 -
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46 K F 2680 -- H1 M
0.010 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2100 -- H1 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2150 -- H1 -
0.022 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2220 -- H1 -
0.033 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2330 -- H1 -
0.047 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2470 -- H1 -
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46 K I 2680 -- H1 -
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46 K I 3100 -- H1 -
0.15 µF	6.0	17.5	18.0	15.0	0.6	400	R46 K I 3150 -- H2 -
0.15 µF	9.0	12.5	18.0	15.0	0.6	400	R46 K I 3150 -- H3 -
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46 K I 3150 -- H1 -
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46 K I 3220 -- H1 -
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 K I 3220 -- H2 M
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 K I 3220 -- H3 M
0.22 µF	7.5	18.5	18.0	15.0	0.8	400	R46 K I 3220 -- H4 -
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 K I 3330 -- H1 M
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 K I 3330 -- H2 M
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 K I 3330 -- H3 M
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 K I 3470 -- H1 M
0.15 µF	6.0	15.0	26.5	22.5	0.8	200	R46 K N 3150 -- H1 -
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46 K N 3220 -- H1 -
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46 K N 3330 -- H1 -
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46 K N 3470 -- H1 -
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46 K N 3680 -- H1 -
1.0 µF	13.0	22.0	26.5	22.5	0.8	200	R46 K N 4100 -- H1 -

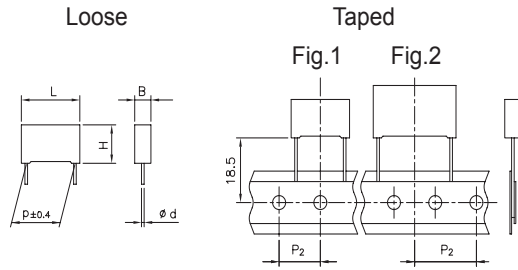
Rated voltage (K=275Vac)  
Mechanical version and packaging (Table 1)  
Tolerance: K (±10%); M (±20%)

E12 Series available upon request

All dimensions are in mm

For "capacitor connected in serial with main line" (two - phase and three - phase net) application, please read the "SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS" at pag. 152 and contact our Technical Service for choosing the safest solution.

X2 CLASS (IEC 60384-14) - MKP Series  
**METALLIZED POLYPROPYLENE FILM CAPACITOR**  
 SELF-HEALING PROPERTIES



Ø d ±0.05	p ≤ 15	22.5 ≤ p ≤ 27.5	p = 37.5
	0.6 or 0.8*	0.8	1.0

\*See size table.  
 All dimensions are in mm.

**GENERAL TECHNICAL DATA**

- Dielectric:** polypropylene film.
- Plates:** metal layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** plastic case, thermosetting resin filled.  
 Box material is solvent resistant and flame retardant according to UL94 V0.
- Marking:** Manufacturer's logo, series, capacitance, tolerance, rated voltage, capacitor class, dielectric code, climatic category, passive flammability category, manufacturing date code, approvals, manufacturing plant.
- Climatic category:** 40/110/56 IEC 60068-1
- Operating temperature range:** -40 to +110°C
- Related documents:** IEC 60384-14, EN 60384-14.

**ELECTRICAL CHARACTERISTICS**

**Rated voltage (V<sub>R</sub>):** 275Vac (50/60Hz) / 560 Vdc

- Capacitance range:** 0.022µF to 10µF
- Capacitance values:** E6 series (IEC 60063 Norm).
- Capacitance tolerances** (measured at 1 kHz):  
 ±10% (K); ±20% (M).  
 tolerance ±5% (J) available upon request

**Dissipation factor (DF):**  
 tgδ 10<sup>-4</sup> at +25°C ±5°C: ≤15 (8)\* at 1kHz  
 \* Typical value

**Insulation resistance:**

**Test conditions**  
 Temperature: +25°C ±5°C  
 Voltage charge time: 1 min  
 Voltage charge: 100 Vdc

**Performance**  
 ≥1x10<sup>5</sup> MΩ (5x10<sup>5</sup> MΩ)\* for C ≤ 0.33µF  
 ≥30000 s (150000 s)\* for C > 0.33µF  
 \* Typical value

**Test voltage between terminations** (on all pieces):  
 1500Vac for 1 s + 2200Vdc for 1 s at +25°C ±5°C

**Typical applications:** This special R46 release is specifically designed for applications with particular protection against severe ambient conditions.

PRODUCT CODE: **R46**

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
10.0	All	B +0.2	H +0.1	L +0.2
15.0	<7.5	B +0.2	H +0.1	L +0.3
15.0	≥7.5	B +0.2	H +0.1	L +0.5
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

**TEST METHOD AND PERFORMANCE**

**Damp heat, steady state:**

**Test conditions 1st**

Temperature: +40°C ± 2°C  
 Relative humidity (RH): 93% ±2%  
 Test duration: 56 days

**Test conditions 2nd**

Temperature: +60°C ± 2°C  
 Relative humidity (RH): 95% ±2%  
 Test duration: 500 hours

**Test conditions 3rd**

Temperature: +40°C ± 2°C  
 Relative humidity (RH): 93% ±2%  
 Test duration: 500 hours  
 Voltage value: 230 Vac, 50 Hz

**Performance**

Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
 Capacitance change |ΔC/C|: ≤5%  
 Insulation resistance: ≥50% of initial limit.

**Endurance:**

**Test conditions**

Temperature: +110°C ± 2°C  
 Test duration: 1000 h  
 Voltage applied: 1.25 x V<sub>R</sub> +1000Vac 0.1 s/h

**Performance**

Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
 Capacitance change |ΔC/C|: ≤10%  
 Insulation resistance: ≥50% of initial limit.

**Resistance to soldering heat:**

**Test conditions**

Solder bath temperature: +260°C ± 5°C  
 Dipping time (with heat screen): 10 s ± 1 s

**Performance**

Capacitance change |ΔC/C|: ≤2%

X2 CLASS (IEC60384-14) - MKP Series  
**METALLIZED POLYPROPYLENE FILM CAPACITOR**  
 SELF-HEALING PROPERTIES

APPROVALS

Rated Cap. (*)	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number			
	B	H	L	p						
0.022 µF	4.0	9.0	13.0	10.0	0.6	500	R46 KF	2220	-- S0	-
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	2330	-- S0	-
0.047 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	2470	-- S0	-
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	2680	-- S0	-
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2680	-- S0	-
0.10 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	3100	-- S1	M
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3100	-- S0	-
0.15 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3150	-- S1	M
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3150	-- S0	-
0.22 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3220	-- S1	M
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46 KI	3220	-- S0	-
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3220	-- S2	-
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3220	-- S3	-
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 KI	3330	-- S1	-
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 KI	3330	-- S0	-
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 KI	3330	-- S2	-
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3470	-- S0	-
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3220	-- S0	-
0.33 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3330	-- S1	M
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3330	-- S0	-
0.47 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3470	-- S1	M
0.47 µF	8.5	17.0	26.5	22.5	0.8	200	R46 KN	3470	-- S0	-
0.68 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	3680	-- S0	-
1.0 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4100	-- S2	M
1.0 µF	11.0	20.0	26.5	22.5	0.8	200	R46 KN	4100	-- S1	-
1.0 µF	13.0	22.0	26.5	22.5	0.8	200	R46 KN	4100	-- S0	-
1.2 µF	13.0	22.0	26.5	22.5	0.8	200	R46 KN	4120	-- S0	-
0.47 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	3470	-- S0	-
0.68 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	3680	-- S1	-
1.0 µF	11.0	20.0	32.0	27.5	0.8	150	R46 KR	4100	-- S1	-
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46 KR	4150	-- S1	-
2.2 µF	13.0	25.0	32.0	27.5	0.8	150	R46 KR	4220	-- S2	-
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4330	-- S2	-
4.7 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4470	-- S2	-
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4150	-- S1	-
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4220	-- S2	M
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46 KW	4220	-- S1	-
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4330	-- S1	-
4.7 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4470	-- S2	M
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46 KW	4470	-- S1	-
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46 KW	4680	-- S2	-
10.0 µF	30.0	45.0	41.5	37.5	1.0	100	R46 KW	5100	-- S1	-

Rated voltage (K=275Vac)  
 Mechanical version and packaging (Table 1)  
 Tolerance: K (±10%); M (±20%)

E12 Series available upon request  
 All dimensions are in mm

	ENEC IEC 60384-14	Class X2	File No.V4413
	CSA E 384-14-95 (up to 5.6 µF)	Across-the-line	File No.154612 (LR 83890)
	UL 1414 up to 1µF, 85°C; 250Vac)	Across-the-line	File No.E97797
	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238
	GB/T 14472	Class X2	File CQC3001008199 CQC3001008842

Approved according to IEC 60384-14 (ex-former EN 132400)  
 According to IEC 60065

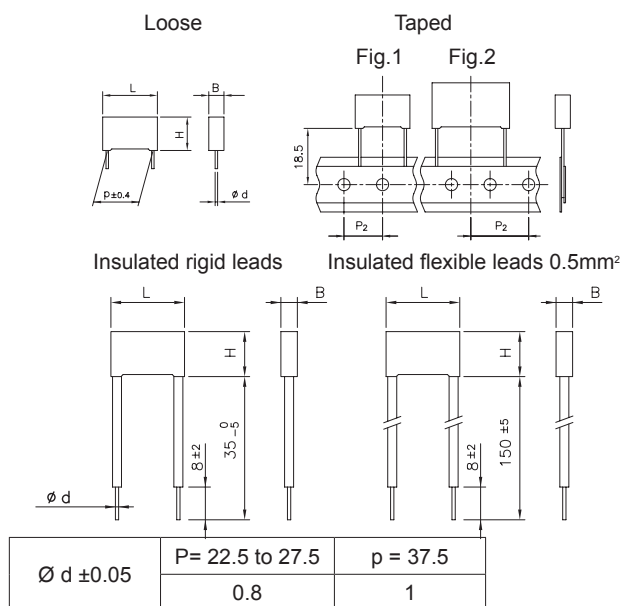
(\*\*) ENEC mark has replaced all the following European National marks:



Table 1

Standard packaging style	Lead length (mm)	Taping style			Ordering code (Digit 10 to 11)
		P <sub>2</sub> (mm)	Fig. (No.)	Pitch (mm)	
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø500mm		12.70	1	10.0/15.0	CK
REEL Ø500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 <sup>+2</sup>				00
Loose, long leads	25 <sup>-1/2</sup>				50
Loose, long leads	30 <sup>+5</sup>				40
Loose, insulated rigid leads	30 <sup>+5</sup>				51
Loose, insulated flexible leads	150 <sup>±5</sup>				52

Note: Ammo-pack is the preferred packaging for taped version.



All dimensions are in mm.

### GENERAL TECHNICAL DATA

- Dielectric:** polypropylene film.
- Plates:** metal layer deposited by evaporation under vacuum.
- Winding:** non-inductive type.
- Leads:** tinned wire.
- Protection:** plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94 V0.
- Marking:** Manufacturer's logo, series, capacitance, tolerance, rated voltage, capacitor class, dielectric code, climatic category, passive flammability category, manufacturing date code, approvals, manufacturing plant.

**Climatic category:** 40/110/56 IEC 60068-1  
**Operating temperature range:** -40 to +110°C  
**Related documents:** IEC 60384-14, EN 60384-14.

### ELECTRICAL CHARACTERISTICS

**Rated voltage (V<sub>R</sub>):** 275Vac (50/60Hz) / 560 Vdc  
 300Vac (50/60Hz) / 630 Vdc

**Capacitance range:** 0.22µF to 10µF  
**Capacitance values:** E6 series (IEC 60063 Norm).  
**Capacitance tolerances** (measured at 1 kHz): ±10% (K); ±20% (M).

**Dissipation factor (DF):** tgδ 10<sup>-4</sup> at +25°C ±5°C: ≤10 (6)\* at 1kHz  
 \* Typical value

**Insulation resistance:**  
**Test conditions**  
 Temperature: +25°C±5°C  
 Voltage charge time: 1 min  
 Voltage charge: 100 Vdc

**Performance**  
 ≥1x10<sup>5</sup> MΩ (5x10<sup>5</sup> MΩ)\* for C≤0.33µF  
 ≥30000 s (150000 s)\* for C>0.33µF  
 \* Typical value

**Test voltage between terminations** (on all pieces):  
 1500Vac for 1 s + 2200Vdc for 1 s at +25°C±5°C

## Capacitors with discharge resistor X2 CLASS (IEC 60384-14) - MKP Series METALLIZED POLYPROPYLENE FILM CAPACITOR SELF-HEALING PROPERTIES

**Typical applications:** interference suppression and «across-the-line» applications. Suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.

PRODUCT CODE: **R46**

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

### TEST METHOD AND PERFORMANCE

#### Damp heat, steady state:

##### Test conditions 1st

Temperature: +40°C ± 2°C  
 Relative humidity (RH): 93% ±2%  
 Test duration: 56 days

##### Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
 Capacitance change |ΔC/C|: ≤5%  
 Insulation resistance: ≥50% of initial limit.

#### Endurance:

##### Test conditions

Temperature: +110°C ± 2°C  
 Test duration: 1000 h  
 Voltage applied: 1.25 x V<sub>R</sub> +1000Vac 0.1 s/h

##### Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min  
 Capacitance change |ΔC/C|: ≤10%  
 Insulation resistance: ≥50% of initial limit.

#### Resistance to soldering heat:

##### Test conditions

Solder bath temperature: +260°C ± 5°C  
 Dipping time (with heat screen): 10 s ± 1 s

##### Performance

Capacitance change |ΔC/C|: ≤2%

### APPROVALS

	ENEC IEC 60384-14	Class X2	File No.V4413
	UL 1414 up to 1µF, 85°C; 250Vac	Across-the-line	File No.E97797
	UL 1283 (250 Vac-105°C)	Electromagnetic Interference Filters	File No.E85238

Approved according to IEC 60384-14 (ex-former EN 132400)  
 According to IEC 60065.



Capacitors with discharge resistor  
X2 CLASS (IEC 60384-14) - MKP Series  
**METALLIZED POLYPROPYLENE FILM CAPACITOR**  
SELF-HEALING PROPERTIES

PRODUCT CODE: R46

Rated Cap. (*)	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number
	B	H	L	p			
0.22 µF	7.0	16.0	26.5	22.5	0.8	200	R46KN 3220 -- 01 --
0.33 µF	8.5	17.0	26.5	22.5	0.8	200	R46KN 3330 -- 01 --
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46KN 3470 -- 01 --
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46KN 3680 -- 01 --
0.47 µF	11.0	20.0	32.0	27.5	0.8	150	R46KR 3470 -- 01 --
0.68 µF	11.0	20.0	32.0	27.5	0.8	150	R46KR 3680 -- M1 --
1.0 µF	13.0	22.0	32.0	27.5	0.8	150	R46KR 4100 -- M1 --
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46KR 4150 -- M1 --
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R46KR 4220 -- M1 --
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46KR 4330 -- M2 --
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46KR 4470 -- M1 --
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46KW 4150 -- M1 --
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46KW 4220 -- M1 --
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46KW 4330 -- M1 --
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46KW 4470 -- M1 --
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46KW 4680 -- M2 --
10.0 µF	24.0	44.0	41.5	37.5	1.0	100	R46KW 5100 -- M1 --

Rated voltage (K=275Vac) \_\_\_\_\_  
 Mechanical version and packaging (Table 1) \_\_\_\_\_  
 Tolerance: K (±10%); M (±20%) \_\_\_\_\_  
 Value of discharge resistor (Table 2) \_\_\_\_\_

Rated Cap. (*)	300 Vac / 630 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number
	B	H	L	p			
0.22 µF	7.0	16.0	26.5	22.5	0.8	200	R463N 3220 -- 01 --
0.33 µF	8.5	17.0	26.5	22.5	0.8	200	R463N 3330 -- 01 --
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R463N 3470 -- 01 --
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R463N 3680 -- 01 --
0.47 µF	11.0	20.0	32.0	27.5	0.8	150	R463R 3470 -- 01 --
0.68 µF	11.0	20.0	32.0	27.5	0.8	150	R463R 3680 -- M1 --
1.0 µF	13.0	22.0	32.0	27.5	0.8	150	R463R 4100 -- M1 --
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R463R 4150 -- M1 --
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R463R 4220 -- M1 --
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R463R 4330 -- M2 --
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R463R 4470 -- M1 --
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R463W 4150 -- M1 --
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R463W 4220 -- M1 --
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R463W 4330 -- M1 --
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R463W 4470 -- M1 --
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R463W 4680 -- M2 --
10.0 µF	24.0	44.0	41.5	37.5	1.0	100	R463W 5100 -- M1 --

Rated voltage (3=300Vac) \_\_\_\_\_  
 Mechanical version and packaging (Table 1) \_\_\_\_\_  
 Tolerance: K (±10%); M (±20%) \_\_\_\_\_  
 Value of discharge resistor (Table 2) \_\_\_\_\_

Table 1

Standard packaging style	Lead length (mm)	Taping style			Ordering code (Digit 10 to 11)
		P <sub>2</sub> (mm)	Fig. (No.)	Pitch (mm)	
REEL Ø500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 <sup>+2</sup>				00
Loose, long leads	25 <sup>-1/±2</sup>				50
Loose, long leads	30 <sup>+5</sup>				40
Loose, insulated rigid leads	30 <sup>+5</sup>				51
Loose, insulated flexible leads	150 <sup>±5</sup>				52

PRODUCT CODE SYSTEM

The part number, comprising 15 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	4	6										-		-

- Digit 1 to 3 Series code.
- Digit 4 a.c. rated voltage:  
K = 275Vac; 3 = 300Vac
- Digit 5 Pitch:  
N = 22.5; R = 27.5; W = 37.5 mm
- Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
- Digit 10 to 11 Mechanical version and/or packaging (table 1)
- Digit 12 Identifies the dimensions and electrical characteristics.
- Digit 13 Internal use
- Digit 14 Capacitance tolerance:  
K=±10%; M=±20%
- Digit 15 Value of the discharge resistor (tolerance±10%) according to the following table\*:

Table 2

R	code (-)
470 kΩ	E
680 kΩ	F
1 MΩ	G
1.2 MΩ	L
1.5 MΩ	N
2.2 MΩ	P
3.3 MΩ	Q
4.7 MΩ	S
6.8 MΩ	T
10 MΩ	V

\*Other resistors are available upon request.

All dimensions are in mm