DATA SHEET

MKT 467/468/469
MKT/MKT 468
Metallized polyester film capacitors

Product specification
Supersedes data of April 1999
File under BCcomponents, BC05

2001 Jun 22

BC COMPONENTS

MKT RADIAL EPOXY LACQUERED TYPE

PITCH 10/15/22.5/27.5 mm
PITCH 7.5 (bent back leads)

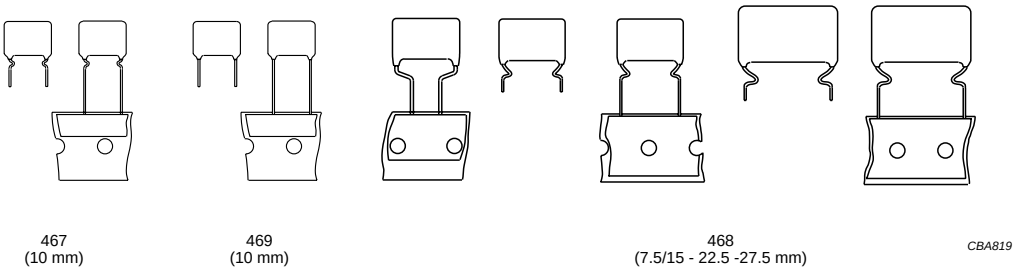


Fig.1 Simplified outlines.

FEATURES

- Low-inductive wound cell of metallized (PETP) film
- Cell protected by epoxy lacquer
- Radial leads of solder-coated wire
- Withstands solvents and rinsing liquids

APPLICATIONS

- Blocking and coupling
- Bypass and energy reservoir.

DETAIL SPECIFICATION

For more detailed data and test requirements see *"Type detail specification HQN-384-02/102"*.

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Capacitance range (E12 series)	0.01 to 10 µF
Capacitance tolerance	±10%; ±5%
Rated (DC) voltage	100 V; 250 V; 400 V; 630 V; 1000 V
Rated (AC) voltage	63 V; 160 V; 200 V; 250 V; 400 V
Climatic category	55/105/56
Rated temperature	85 °C
Maximum application temperature	105 °C
Reference specifications	IEC 60384-2
Performance grade	grade 1 (long life)
Materials	qualified in accordance with UL94 V-0

Metallized polyester film capacitors

MKT 467/468/469
MKT/MKT 468

COMPOSITION OF CATALOGUE NUMBER

TYPE AND PITCHES	
467	10.0 mm
468	15/7.5 mm
	15.0 mm
	22.5 mm
	27.5 mm
469	10.0 mm

CAPACITANCE (numerically)

MULTIPLIER (nF)	
0.1	2
1	3
10	4
100	5

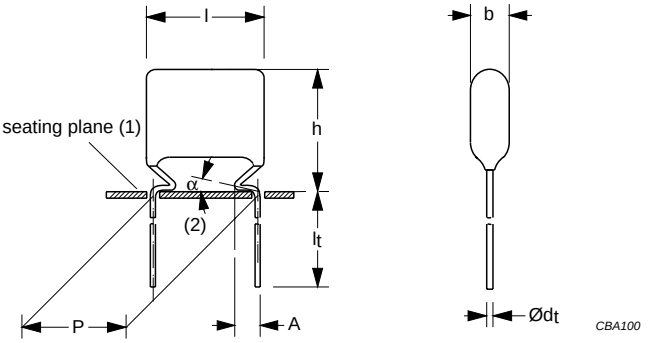
Example:
104 = 10 x 10 = 100 nF

2222	46.	XX	XX	X

TYPE	PACKAGING	LEAD CONFIGURATION	PREFERRED TYPES					
			C-TOL	100 V	250 V	400 V	630 V	1000 V
MKT 467	loose in box	lead length 3.5 mm	±10%	04	16	28	40	-
			±5%	05	17	29	41	-
MKT 468	loose in box	lead length 3.5 mm	±10%	04	16	28	40	-
			±5%	05	17	29	41	-
	taped on reel	bent back leads	±10%	61	63	65	67	-
			±5%	62	64	66	68	-
MKT/MKT 468	loose in box	lead length 3.5 mm	±10%	-	-	-	-	60
			ON REQUEST					
MKT 467	loose in box	lead length 19.0 mm	±10%	51	53	55	57	-
			±5%	52	54	56	58	-
	taped on reel		±10%	06	18	30	42	-
			±5%	07	19	31	43	-
MKT 468	loose in box	long leads	±10%	51	53	55	57	-
			±5%	52	54	56	58	-
	taped on reel		±10%	06	18	30	42	-
			±5%	07	19	31	43	-
MKT 469	loose in box	lead length 4.0 mm	±10%	25	45	55	65	-
			±5%	26	46	56	66	-
		lead length 22.0 mm	±10%	21	41	51	61	-
			±5%	22	42	52	62	-
	taped on reel		±10%	28	48	58	68	-
			±5%	29	49	59	69	-

Metallized polyester film capacitors MKT 467

MKT 467 GENERAL DATA **PITCH 10 mm (kinked leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

(2) $0 \leq \alpha < 50°$.

(3) A = 2.0 ±0.5 mm.

Fig.3 Outline.

Specific reference data for the 100 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
C ≤ 0.1 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
0.1 µF < C ≤ 0.47 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
0.47 µF < C ≤ 1.0 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	–
Rated voltage pulse slope $(dU/dt)_R$ at 100 V (DC)	30 V/µs		
RC between leads, for C > 0.33 µF at 100 V; 1 minute	>5000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 minute		
Withstanding (DC) voltage between leads and case	200 V; 1 minute		

Available 100 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 467 04...	preferred
		±5%	2222 467 05...	preferred
	l_t = 19.0 ±4.0 mm	±10%	2222 467 51...	on request
		±5%	2222 467 52...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 467 06...	on request
		±5%	2222 467 07...	on request

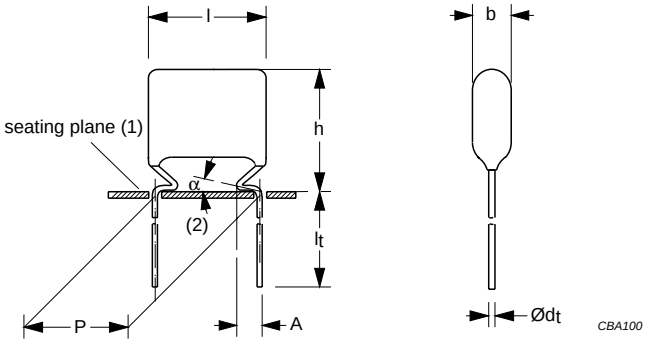
Metallized polyester film capacitors MKT 467

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (µF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			l_t = 3.5 ±0.5 mm	
			C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm				
0.056	4.0 × 13.0 × 12.5	0.4	2222 467 04**563**	.. 05**563**
0.068			2222 467 04**683**	.. 05**683**
0.082			2222 467 04**823**	.. 05**823**
0.1			2222 467 04**104**	.. 05**104**
0.12	4.3 × 13.3 × 12.5	0.5	2222 467 04**124**	.. 05**124**
0.15	4.0 × 13.0 × 12.5	0.4	2222 467 04**154**	.. 05**154**
0.18	4.2 × 13.2 × 12.5	0.4	2222 467 04**184**	.. 05**184**
0.22	4.5 × 13.6 × 12.5	0.5	2222 467 04**224**	.. 05**224**
0.27	4.2 × 13.2 × 12.5	0.4	2222 467 04**274**	.. 05**274**
0.33	4.6 × 13.6 × 12.5	0.5	2222 467 04**334**	.. 05**334**
0.39	4.0 × 13.0 × 12.5	0.4	2222 467 04**394**	.. 05**394**
0.47	4.2 × 13.2 × 12.5	0.4	2222 467 04**474**	.. 05**474**
0.56	4.6 × 13.6 × 12.5	0.5	2222 467 04**564**	.. 05**564**
0.68	5.0 × 14.0 × 12.5	0.5	2222 467 04**684**	.. 05**684**
0.82	5.5 × 14.5 × 12.5	0.6	2222 467 04**824**	.. 05**824**
1.0	6.0 × 15.0 × 12.5	0.6	2222 467 04**105**	.. 05**105**

Metallized polyester film capacitors MKT 467

MKT 467 GENERAL DATA **PITCH 10 mm (kinked leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

(2) $0 \leq \alpha < 50°$.

(3) A = 2.0 ±0.5 mm.

Fig.4 Outline.

Specific reference data for the 250 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 220 \times 10^{-4}$
0.1 µF < C ≤ 0.22 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 250 V (DC)	120 V/µs		
R between leads, for C ≤ 0.33 µF at 100 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	400 V; 1 minute		
Withstanding (DC) voltage between leads and case	500 V; 1 minute		

Available 250 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 467 16...	preferred
		±5%	2222 467 17...	preferred
	l_t = 19.0 ±4.0 mm	±10%	2222 467 53...	on request
		±5%	2222 467 54...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 467 18...	on request
		±5%	2222 467 19...	on request

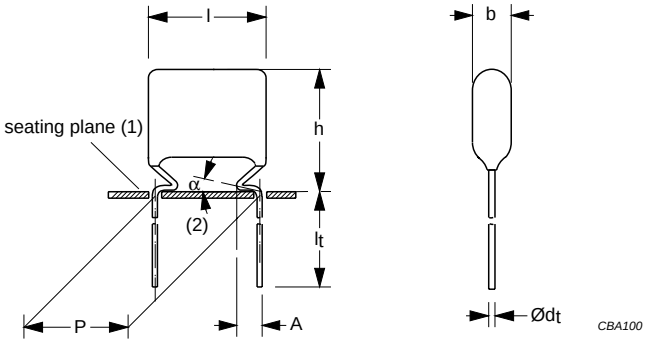
Metallized polyester film capacitors MKT 467

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (µF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			l_t = 3.5 ±0.5 mm	
			C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm				
0.027	4.2 × 13.2 × 12.5	0.4	2222 467 16**273**	.. 17**273**
0.033	4.6 × 13.6 × 12.5	0.5	2222 467 16**333**	.. 17**333**
0.039	4.0 × 13.0 × 12.5	0.4	2222 467 16**393**	.. 17**393**
0.047	4.1 × 13.1 × 12.5	0.4	2222 467 16**473**	.. 17**473**
0.056	4.0 × 13.0 × 12.5	0.4	2222 467 16**563**	.. 17**563**
0.068	4.1 × 13.1 × 12.5	0.4	2222 467 16**683**	.. 17**683**
0.082	4.4 × 13.4 × 12.5	0.5	2222 467 16**823**	.. 17**823**
0.1	4.0 × 13.0 × 12.5	0.4	2222 467 16**104**	.. 17**104**
0.12	4.3 × 13.3 × 12.5	0.5	2222 467 16**124**	.. 17**124**
0.15	4.8 × 13.8 × 12.5	0.5	2222 467 16**154**	.. 17**154**
0.18	5.2 × 14.2 × 12.5	0.5	2222 467 16**184**	.. 17**184**
0.22	5.8 × 14.8 × 12.5	0.6	2222 467 16**224**	.. 17**224**

Metallized polyester film capacitors MKT 467

MKT 467 GENERAL DATA **PITCH 10 mm (kinked leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

(2) $0 \leq \alpha < 50°$.

(3) A = 2.0 ±0.5 mm.

Fig.5 Outline.

Specific reference data for the 400 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 400 V (DC)	170 V/µs		
R between leads, for $C \leq 0.33$ µF at 100 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	640 V; 1 minute		
Withstanding (DC) voltage between leads and case	800 V; 1 minute		

Available 400 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 467 28...	preferred
		±5%	2222 467 29...	preferred
	l_t = 19.0 ±4.0 mm	±10%	2222 467 55...	on request
		±5%	2222 467 56...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 467 30...	on request
		±5%	2222 467 31...	on request

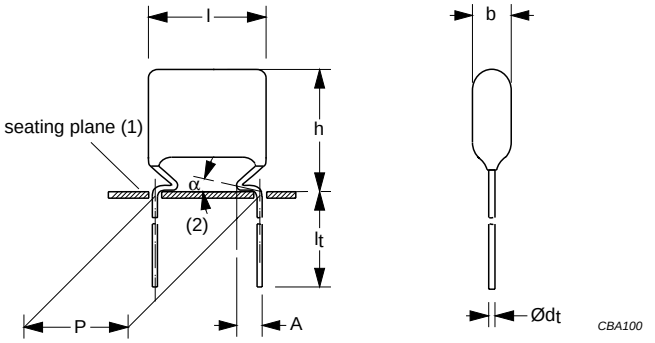
Metallized polyester film capacitors MKT 467

U_{Rdc} = 400 V; U_{Rac} = 200 V

C (µF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			l_t = 3.5 ±0.5 mm	
			C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm				
0.001	4.5 × 13.5 × 12.5	0.5	2222 467 28**102**	.. 29**102**
0.0012			2222 467 28**122**	.. 29**122**
0.0015			2222 467 28**152**	.. 29**152**
0.0018			2222 467 28**182**	.. 29**182**
0.0022	4.0 × 13.0 × 12.5	0.4	2222 467 28**222**	.. 29**222**
0.0027	4.3 × 13.3 × 12.5	0.5	2222 467 28**272**	.. 29**272**
0.0033	4.6 × 13.6 × 12.5	0.5	2222 467 28**332**	.. 29**332**
0.0039	4.0 × 13.0 × 12.5	0.4	2222 467 28**392**	.. 29**392**
0.0047	4.1 × 13.2 × 12.5	0.4	2222 467 28**472**	.. 29**472**
0.0056	4.6 × 13.6 × 12.5	0.5	2222 467 28**562**	.. 29**562**
0.0068	4.2 × 13.2 × 12.5	0.4	2222 467 28**682**	.. 29**682**
0.0082	4.6 × 13.6 × 12.5	0.5	2222 467 28**822**	.. 29**822**
0.01	4.1 × 13.1 × 12.5	0.4	2222 467 28**103**	.. 29**103**
0.012	4.5 × 13.5 × 12.5	0.5	2222 467 28**123**	.. 29**123**
0.015	4.1 × 13.1 × 12.5	0.4	2222 467 28**153**	.. 29**153**
0.018	4.5 × 13.5 × 12.5	0.5	2222 467 28**183**	.. 29**183**
0.022	4.0 × 13.0 × 12.5	0.4	2222 467 28**223**	.. 29**223**
0.027	4.2 × 13.2 × 12.5	0.4	2222 467 28**273**	.. 29**273**
0.033	4.6 × 13.7 × 12.5	0.5	2222 467 28**333**	.. 29**333**
0.039	5.0 × 13.9 × 12.5	0.5	2222 467 28**393**	.. 29**393**
0.047	4.1 × 13.1 × 12.5	0.4	2222 467 28**473**	.. 29**473**
0.056	4.4 × 13.4 × 12.5	0.5	2222 467 28**563**	.. 29**563**
0.068	4.8 × 13.8 × 12.5	0.5	2222 467 28**683**	.. 29**683**
0.082	5.4 × 14.3 × 12.5	0.6	2222 467 28**823**	.. 29**823**
0.1	5.7 × 14.7 × 12.5	0.6	2222 467 28**104**	.. 29**104**

Metallized polyester film capacitors MKT 467

MKT 467 GENERAL DATA **PITCH 10 mm (kinked leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

(2) $0 \leq \alpha < 50°$.

(3) A = 2.0 ±0.5 mm.

Fig.6 Outline.

Specific reference data for the 630 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.033$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 630 V (DC)	120 V/µs		
R between leads, for $C \leq 0.33$ µF at 500 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1008 V; 1 minute		
Withstanding (DC) voltage between leads and case	1260 V; 1 minute		

Available 630 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 467 40...	preferred
		±5%	2222 467 41...	preferred
	l_t = 19.0 ±4.0 mm	±10%	2222 467 57...	on request
		±5%	2222 467 58...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 467 42...	on request
		±5%	2222 467 43...	on request

Metallized polyester film capacitors MKT 467

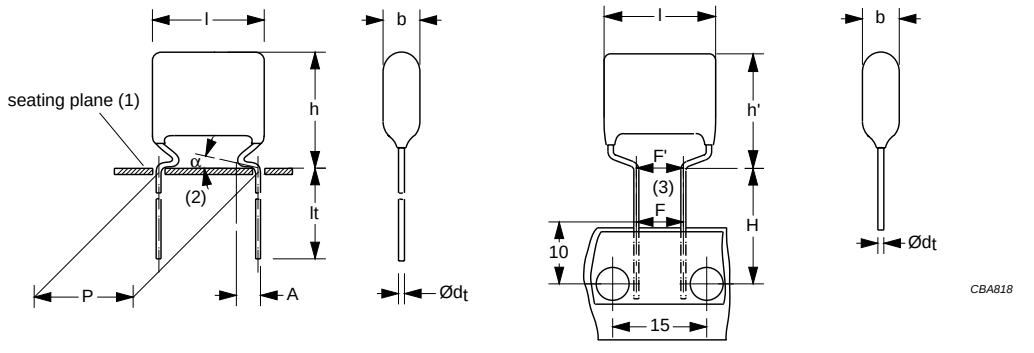
U_{Rdc} = 630 V; U_{Rac} = 250 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			l_t = 3.5 ±0.5 mm	
			C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm				
0.01	4.1 × 13.1 × 12.5	0.4	2222 467 40**103**	.. 41**103**
0.012	4.5 × 13.5 × 12.5	0.5	2222 467 40**123**	.. 41**123**
0.015	4.9 × 13.9 × 12.5	0.5	2222 467 40**153**	.. 41**153**
0.018	5.4 × 14.4 × 12.5	0.6	2222 467 40**183**	.. 41**183**
0.022	4.8 × 13.8 × 12.5	0.5	2222 467 40**223**	.. 41**223**
0.027	5.3 × 14.3 × 12.5	0.6	2222 467 40**273**	.. 41**273**
0.033	5.9 × 14.9 × 12.5	0.6	2222 467 40**333**	.. 41**333**

Metallized polyester film capacitors MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5 mm
PITCH 7.5 mm (bent back leads)



Dimensions in mm.

(1) Hole ∅1.3 for d_t = 0.8 mm.

(2) $0 \leq \alpha < 50°$.

(3) $|F - F'| < 0.3$ mm.
F = 7.5 +0.6/–0.1 mm.

(4) A = 2.5 +1.4/–0.5 mm.

Fig.7 Outline.

Specific reference data for the 100 V DC capacitors

DESCRIPTION	VALUE	
Tangent of loss angle:	at 1 kHz	at 10 kHz
C ≤ 10.0 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 100 V (DC):		
l_{max} = 17.5 mm	20 V/µs	
l_{max} = 26.0 mm	10 V/µs	
RC between leads, for C > 0.33 µF at 100 V; 1 minute	>5000 s	
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ	
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 minute	
Withstanding (DC) voltage between leads and case	200 V; 1 minute	

Available 100 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 468 04...	preferred
		±5%	2222 468 05...	preferred
	long leads; note 1	±10%	2222 468 51...	on request
		±5%	2222 468 52...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 468 06...	on request
		±5%	2222 468 07...	on request
Taped on reel (bent back)	H = 16.0 mm; P_0 = 15.0 mm	±10%	2222 468 61...	preferred
		±5%	2222 468 62...	preferred

Note

1. Length of long leads:
   a) l_t = 19.0 ±4.0 mm for lead pitch = 15.0 mm.
   b) l_t = 25.0 ±4.0 mm for lead pitch = 22.5 mm.

Metallized polyester film capacitors MKT 468

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (μF)	DIMENSIONS(1) $b_{max} \times h\ (h')_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm	
			short leads		H = 16.0 mm; P_0 = 15.0 mm	
			C-tol = ± 10%	C-tol = ± 5%	C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits	last 5 digits	
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
1.2	5.5 × 14.5 (16.0) × 17.5	0.7	2222 468 04**125**	.. 05**125**	.. 61**125**	.. 62**125**
1.5	6.0 × 15.0 (16.5) × 17.5	0.9	2222 468 04**155**	.. 05**155**	.. 61**155**	.. 62**155**
1.8	6.5 × 15.5 (17.0) × 17.5	1.0	2222 468 04**185**	.. 05**185**	.. 61**185**	.. 62**185**
2.2	7.0 × 16.0 (17.5) × 17.5	1.2	2222 468 04**225**	.. 05**225**	.. 61**225**	.. 62**225**
2.7	8.0 × 17.0 (18.5) × 17.5	1.4	2222 468 04**275**	.. 05**275**	.. 61**275**	.. 62**275**
3.3	8.5 × 17.5 (19.0) × 17.5	1.5	2222 468 04**335**	.. 05**335**	.. 61**335**	.. 62**335**
Pitch = 22.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
3.9	6.5 × 18.5 × 26.0	2.8	2222 468 04**395**	.. 05**395**	not available	
4.7	7.0 × 19.5 × 26.0	3.2	2222 468 04**475**	.. 05**475**		
5.6	7.5 × 20.0 × 26.0	3.5	2222 468 04**565**	.. 05**565**		
6.8	8.5 × 21.5 × 26.0	4.1	2222 468 04**685**	.. 05**685**		
8.2	9.5 × 22.5 × 26.0	4.8	2222 468 04**825**	.. 05**825**		
10.0	10.5 × 23.5 × 26.0	5.5	2222 468 04**106**	.. 05**106**		

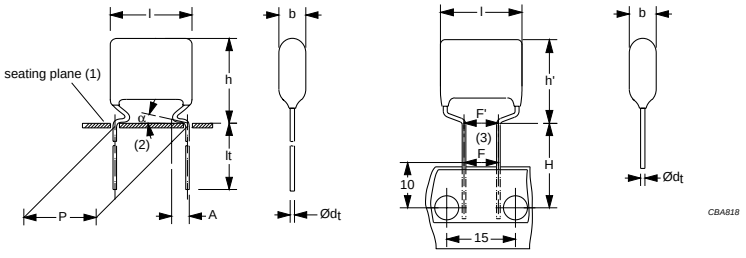
Note

1. Dimensions in brackets for bent back leads.

Metallized polyester film capacitors MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)



Dimensions in mm.

(1) Hole ∅1.3 for d_t = 0.8 mm.

(2) $0 \leq \alpha < 50°$.

(3) $|F - F'| < 0.3$ mm.
F = 7.5 +0.6/–0.1 mm.

(4) A = 2.5 +1.4/–0.5 mm.

Fig.8 Outline.

Specific reference data for the 250 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.47$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
$C > 0.47$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	–
Rated voltage pulse slope $(dU/dt)_R$ at 250 V (DC):			
l_{max} = 17.5 mm	45 V/µs		
l_{max} = 26.0 mm	20 V/µs		
l_{max} = 30.0 mm	15 V/µs		
R between leads, for $C \leq 0.33$ µF at 100 V; 1 minute	>30000 MΩ		
RC between leads, for $C > 0.33$ µF at 100 V; 1 minute	>10000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	400 V; 1 minute		
Withstanding (DC) voltage between leads and case	500 V; 1 minute		

Available 250 V DC versions

PACKAGING(1)	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 468 16...	preferred
		±5%	2222 468 17...	preferred
	long leads; note 2	±10%	2222 468 53...	on request
		±5%	2222 468 54...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 468 18...	on request
		±5%	2222 468 19...	on request
Taped on reel (bent back)	H = 16.0 mm; P_0 = 15.0 mm	±10%	2222 468 63...	preferred
		±5%	2222 468 64...	preferred

Notes

1. Taped on reel pitch = 27.5 mm is not available.
2. Length of long leads:
   a) l_t = 19.0 ±4.0 mm for lead pitch = 15.0 mm.
   b) l_t = 25.0 ±4.0 mm for lead pitch = 22.5 mm.
   c) l_t = 24.0 ±4.0 mm for lead pitch = 27.5 mm.

Metallized polyester film capacitors MKT 468

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (μF)	DIMENSIONS(1) $b_{max} \times h\ (h')_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm	
			short leads		H = 16.0 mm; P_0 = 15.0 mm	
			C-tol = ± 10%	C-tol = ± 5%	C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits	last 5 digits	
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.27	5.0 × 14.0 (15.5) × 17.5	0.6	2222 468 16**274**	.. 17**274**	.. 63**274**	.. 64**274**
0.33	5.5 × 14.5 (16.0) × 17.5	0.7	2222 468 16**334**	.. 17**334**	.. 63**334**	.. 64**334**
0.39	6.0 × 15.0 (16.5) × 17.5	0.9	2222 468 16**394**	.. 17**394**	.. 63**394**	.. 64**394**
0.47	6.5 × 15.5 (17.0) × 17.5	1.0	2222 468 16**474**	.. 17**474**	.. 63**474**	.. 64**474**
0.56	7.5 × 16.5 (18.0) × 17.5	1.3	2222 468 16**564**	.. 17**564**	.. 63**564**	.. 64**564**
0.68	8.0 × 17.0 (18.5) × 17.5	1.4	2222 468 16**684**	.. 17**684**	.. 63**684**	.. 64**684**
0.82	8.5 × 17.5 (19.0) × 17.5	1.5	2222 468 16**824**	.. 17**824**	.. 63**824**	.. 64**824**
1.0	8.0 × 20.0 (21.5) × 17.5	1.7	2222 468 16**105**	.. 17**105**	.. 63**105**	.. 64**105**
Pitch = 22.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
1.2	7.0 × 19.0 × 26.0	3.2	2222 468 16**125**	.. 17**125**	not available	
1.5	8.0 × 21.0 × 26.0	3.8	2222 468 16**155**	.. 17**155**		
1.8	9.0 × 22.0 × 26.0	4.1	2222 468 16**185**	.. 17**185**		
2.2	9.8 × 23.0 × 26.0	4.8	2222 468 16**225**	.. 17**225**		
2.7	11.0 × 24.0 × 26.0	5.9	2222 468 16**275**	.. 17**275**		
3.3	12.5 × 25.5 × 26.0	6.9	2222 468 16**335**	.. 17**335**		
3.9	13.5 × 26.5 × 26.0	7.5	2222 468 16**395**	.. 17**395**		
4.7	14.9 × 28.0 × 26.0	8.6	2222 468 16**475**	.. 17**475**		
Pitch = 27.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
5.6	15.0 × 28.0 × 30.0	9.1	2222 468 16**565**	.. 17**565**	not available	

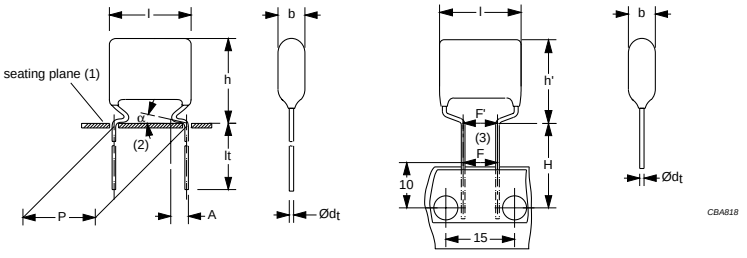
Note

1. Dimensions in brackets for bent back leads.

Metallized polyester film capacitors MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)



Dimensions in mm.

(1) Hole ∅1.3 for d_t = 0.8 mm.

(2) $0 \leq \alpha < 50°$.

(3) $|F - F'| < 0.3$ mm.
F = 7.5 +0.6/–0.1 mm.

(4) A = 2.5 +1.4/–0.5 mm.

Fig.9 Outline.

Specific reference data for the 400 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.47$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
$C > 0.47$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	–
Rated voltage pulse slope $(dU/dt)_R$ at 400 V (DC):			
l_{max} = 17.5 mm	65 V/µs		
l_{max} = 26.0 mm	30 V/µs		
l_{max} = 30.0 mm	25 V/µs		
R between leads, for $C \leq 0.33$ µF at 100 V; 1 minute	>30000 MΩ		
RC between leads, for $C > 0.33$ µF at 100 V; 1 minute	>10000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	640 V; 1 minute		
Withstanding (DC) voltage between leads and case	800 V; 1 minute		

Available 400 V DC versions

PACKAGING(1)	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 468 28...	preferred
		±5%	2222 468 29...	preferred
	long leads; note 2	±10%	2222 468 55...	on request
		±5%	2222 468 56...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 468 30...	on request
		±5%	2222 468 31...	on request
Taped on reel (bent back)	H = 16.0 mm; P_0 = 15.0 mm	±10%	2222 468 65...	preferred
		±5%	2222 468 66...	preferred

Notes

1. Taped on reel pitch = 27.5 mm is not available.
2. Length of long leads:
   a) l_t = 19.0 ±4.0 mm for lead pitch = 15.0 mm.
   b) l_t = 25.0 ±4.0 mm for lead pitch = 22.5 mm.
   c) l_t = 24.0 ±4.0 mm for lead pitch = 27.5 mm.

Metallized polyester film capacitors MKT 468

U_{Rdc} = 400 V; U_{Rac} = 200 V

C (μF)	DIMENSIONS(1) $b_{max} \times h\ (h')_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm	
			short leads		H = 16.0 mm; P_0 = 15.0 mm	
			C-tol = ± 10%	C-tol = ± 5%	C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits	last 5 digits	
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.12	5.0 × 14.0 (15.5) × 17.5	0.6	2222 468 28**124**	.. 29**124**	.. 65**124**	.. 66**124**
0.15	5.8 × 15.0 (16.5) × 17.5	0.9	2222 468 28**154**	.. 29**154**	.. 65**154**	.. 66**154**
0.18	6.5 × 15.5 (17.0) × 17.5	1.0	2222 468 28**184**	.. 29**184**	.. 65**184**	.. 66**184**
0.22	7.0 × 15.5 (17.5) × 17.5	1.2	2222 468 28**224**	.. 29**224**	.. 65**224**	.. 66**224**
0.27	7.4 × 16.5 (18.0) × 17.5	1.3	2222 468 28**274**	.. 29**274**	.. 65**274**	.. 66**274**
0.33	8.5 × 17.5 (19.0) × 17.5	1.5	2222 468 28**334**	.. 29**334**	.. 65**334**	.. 66**334**
0.39	7.4 × 19.5 (21.0) × 17.5	1.3	2222 468 28**394**	.. 29**394**	.. 65**394**	.. 66**394**
0.47	8.4 × 20.5 (22.0) × 17.5	1.5	2222 468 28**474**	.. 29**474**	.. 65**474**	.. 66**474**
Pitch = 22.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.56	7.5 × 19.5 × 26.0	3.2	2222 468 28**564**	.. 29**564**	not available	
0.68	8.0 × 21.0 × 26.0	3.8	2222 468 28**684**	.. 29**684**		
0.82	9.0 × 22.0 × 26.0	4.5	2222 468 28**824**	.. 29**824**		
1.0	9.9 × 23.0 × 26.0	5.2	2222 468 28**105**	.. 29**105**		
1.2	11.0 × 24.0 × 26.0	5.9	2222 468 28**125**	.. 29**125**		
Pitch = 27.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
1.5	11.5 × 24.5 × 30.0	6.5	2222 468 28**155**	.. 29**155**	not available	
1.8	12.5 × 25.5 × 30.0	7.1	2222 468 28**185**	.. 29**185**		
2.2	14.0 × 27.0 × 30.0	8.2	2222 468 28**225**	.. 29**225**		

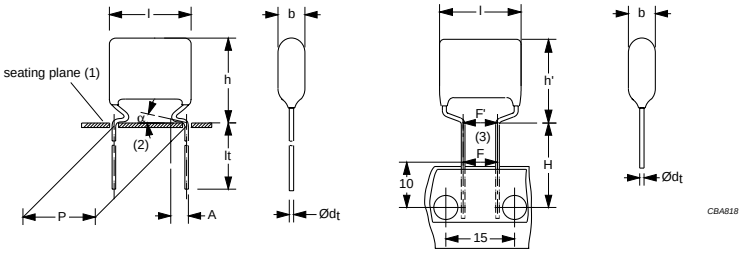
Note

1. Dimensions in brackets for bent back leads.

Metallized polyester film capacitors MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)



Dimensions in mm.

(1) Hole ∅1.3 for d_t = 0.8 mm.

(2) $0 \leq \alpha < 50°$.

(3) $|F - F'| < 0.3$ mm.
F = 7.5 +0.6/–0.1 mm.

(4) A = 2.5 +1.4/–0.5 mm.

Fig.10 Outline.

Specific reference data for the 630 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1$ µFp	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
0.1 µF < C ≤ 0.47 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
C > 0.47 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	–
Rated voltage pulse slope $(dU/dt)_R$ at 630 V (DC):			
l_{max} = 17.5 mm	90 V/µs		
l_{max} = 26.0 mm	35 V/µs		
l_{max} = 30.0 mm	30 V/µs		
R between leads, for C ≤ 0.33 µF at 500 V; 1 minute	>30000 MΩ		
RC between leads, for C > 0.33 µF at 500 V; 1 minute	>10000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1008 V; 1 minute		
Withstanding (DC) voltage between leads and case	1260 V; 1 minute		

Available 630 V DC versions

PACKAGING(1)	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 3.5 ±0.5 mm	±10%	2222 468 40...	preferred
		±5%	2222 468 41...	preferred
	long leads; note 2	±10%	2222 468 57...	on request
		±5%	2222 468 58...	on request
Taped on reel	H = 16.0 mm; P_0 = 12.7 mm	±10%	2222 468 42...	on request
		±5%	2222 468 43...	on request
Taped on reel (bent back)	H = 16.0 mm; P_0 = 15.0 mm	±10%	2222 468 67...	preferred
		±5%	2222 468 68...	preferred

Notes

1. Taped on reel pitch = 27.5 mm is not available.
2. Length of long leads:
   a) l_t = 19.0 ±4.0 mm for lead pitch = 15.0 mm.
   b) l_t = 25.0 ±4.0 mm for lead pitch = 22.5 mm.
   c) l_t = 24.0 ±4.0 mm for lead pitch = 27.5 mm.

U_{Rdc} = 630 V; U_{Rac} = 250 V

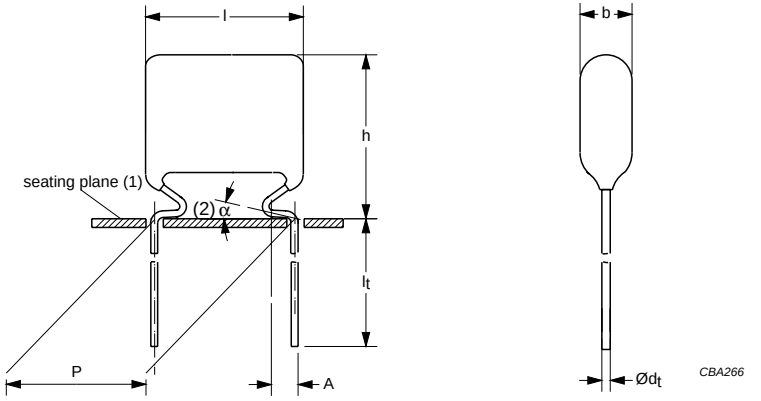
C (μF)	DIMENSIONS(1) $b_{max} \times h\ (h')_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm	
			short leads		H = 16.0 mm; P_0 = 15.0 mm	
			C-tol = ± 10%	C-tol = ± 5%	C-tol = ± 10%	C-tol = ± 5%
			catalogue number	last 5 digits	last 5 digits	
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.039	5.0 × 14.0 (15.5) × 17.5	0.6	2222 468 40**393**	.. 41**393**	.. 67**393**	.. 68**393**
0.047	5.5 × 14.5 (16.0) × 17.5	0.7	2222 468 40**473**	.. 41**473**	.. 67**473**	.. 68**473**
0.056	5.9 × 15.0 (16.5) × 17.5	0.9	2222 468 40**563**	.. 41**563**	.. 67**563**	.. 68**563**
0.068	6.5 × 16.0 (17.5) × 17.5	1.2	2222 468 40**683**	.. 41**683**	.. 67**683**	.. 68**683**
0.082	7.3 × 16.5 (18.0) × 17.5	1.3	2222 468 40**823**	.. 41**823**	.. 67**823**	.. 68**823**
0.1	7.9 × 17.0 (18.5) × 17.5	1.4	2222 468 40**104**	.. 41**104**	.. 67**104**	.. 68**104**
0.12	7.5 × 19.5 (21.0) × 17.5	1.3	2222 468 40**124**	.. 41**124**	.. 67**124**	.. 68**124**
0.15	8.5 × 20.5 (22.0) × 17.5	1.5	2222 468 40**154**	.. 41**154**	.. 67**154**	.. 68**154**
Pitch = 22.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.18	7.5 × 19.5 × 26.0	3.5	2222 468 40**184**	.. 41**184**	not available	
0.22	8.0 × 21.0 × 26.0	3.8	2222 468 40**224**	.. 41**224**		
0.27	9.0 × 22.0 × 26.0	4.5	2222 468 40**274**	.. 41**274**		
0.33	10.0 × 23.0 × 26.0	5.2	2222 468 40**334**	.. 41**334**		
0.39	11.5 × 24.0 × 26.0	5.9	2222 468 40**394**	.. 41**394**		
0.47	12.5 × 25.5 × 26.0	6.9	2222 468 40**474**	.. 41**474**		
0.56	13.5 × 26.6 × 26.0	7.5	2222 468 40**564**	.. 41**564**		
0.68	15.0 × 28.0 × 26.0	8.6	2222 468 40**684**	.. 41**684**		
Pitch = 27.5 ±0.4 mm; d_t = 0.80 ±0.08 mm					**pitch = 7.5 mm (bent back)**	
0.82	15.0 × 28.0 × 30.0	8.8	2222 468 40**824**	.. 41**824**	not available	

Note

1. Dimensions in brackets for bent back leads.

Metallized polyester film capacitors MKT/MKT 468

MKT/MKT 468 GENERAL DATA **PITCH 15/22.5/27.5 mm**



Dimensions in mm.

(1) Hole ∅1.3 for d_t = 0.8 mm.

(2) $0 \leq \alpha < 50°$.

(3) A = 2.5 +1.4/–0.5 mm.

Fig.11 Outline.

Specific reference data for the 1000 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
0.1 µF < C ≤ 0.22 µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 1000 V (DC)			
P = 15 mm	200 V/ms		
P = 22.5 mm	120 V/ms		
P = 27.5 mm	100 V/ms		
R between leads, for C ≤ 0.33 µF at 500 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1600; 1 minute		
Withstanding (DC) voltage between leads and case	2000 V; 1 minute		

Available 1000 V DC versions

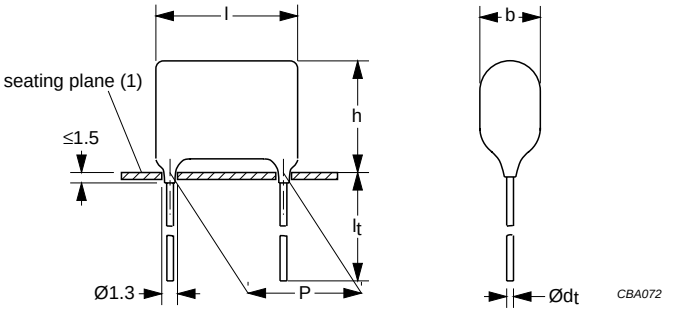
PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	±10%	2222 468 60...	preferred

U_{Rdc} = 1000 V; U_{Rac} = 400 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER LOOSE IN BOX l_t = 3.5 ±0.5 mm C-tol = ±10%
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm			
0.015	6.0 × 15.0 × 17.5	0.6	2222 468 60**153**
0.018	6.5 × 15.5 × 17.5	0.7	2222 468 60**183**
0.022	7.2 × 16.2 × 17.5	0.9	2222 468 60**223**
0.027	8.0 × 17.0 × 17.5	1.0	2222 468 60**273**
0.033	8.8 × 17.8 × 17.5	1.4	2222 468 60**333**
0.039	9.6 × 18.6 × 17.5	1.5	2222 468 60**393**
0.047	10.6 × 19.6 × 17.5	1.8	2222 468 60**473**
Pitch = 22.5 ±0.4 mm; d_t = 0.80 ±0.08 mm			
0.056	7.0 × 20.0 × 26.0	3.2	2222 468 60**563**
0.068	8.0 × 21.0 × 26.0	3.8	2222 468 60**683**
0.082	8.5 × 21.5 × 26.0	4.1	2222 468 60**823**
0.1	9.5 × 22.5 × 26.0	4.8	2222 468 60**104**
0.12	10.5 × 23.5 × 26.0	5.5	2222 468 60**124**
Pitch = 27.5 ±0.4 mm; d_t = 0.80 ±0.08 mm			
0.15	10.5 × 23.5 × 30.0	5.8	2222 468 60**154**
0.18	11.5 × 24.5 × 30.0	6.5	2222 468 60**184**
0.22	13.0 × 26.0 × 30.0	7.5	2222 468 60**224**

Metallized polyester film capacitors MKT 469

MKT 469 GENERAL DATA **PITCH 10 mm (straight leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

Fig.12 Outline.

Specific reference data for the 100 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1\ \mu F$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
$0.1\ \mu F < C \leq 0.47\ \mu F$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
$0.47\ \mu F < C \leq 1.0\ \mu F$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	–
Rated voltage pulse slope $(dU/dt)_R$ at 100 V (DC)	30 V/µs		
RC between leads, for C > 0.33 µF at 100 V; 1 minute	>5000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 minute		
Withstanding (DC) voltage between leads and case	200 V; 1 minute		

Available 100 V DC versions

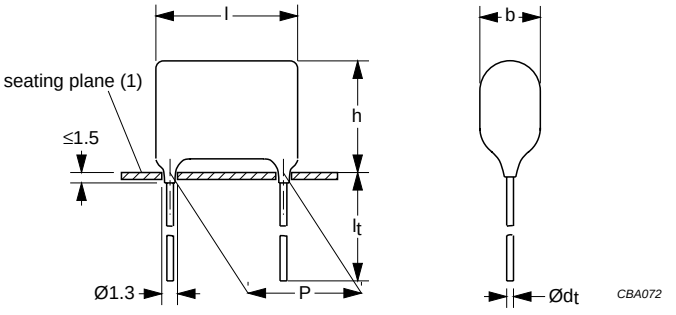
PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 4.0+1.0/–0.5 mm	±10%	2222 469 25...	on request
		±5%	2222 469 26...	on request
	l_t = 22.0 ±4.0 mm	±10%	2222 469 21...	on request
		±5%	2222 469 22...	on request
Taped on reel	H = 18.5 mm; P_0 = 12.7 mm	±10%	2222 469 28...	on request
		±5%	2222 469 29...	on request

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER LOOSE IN BOX l_t = 4.0 +1.0/−0.5 mm C-tol = ±10%
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm			
0.056	4.0 × 9.3 × 12.5	0.4	2222 469 25**563**
0.068			2222 469 25**683**
0.082			2222 469 25**823**
0.1			2222 469 25**104**
0.12	4.3 × 9.7 × 12.5	0.5	2222 469 25**124**
0.15	3.9 × 9.2 × 12.5	0.4	2222 469 25**154**
0.18	4.2 × 9.5 × 12.5	0.4	2222 469 25**184**
0.22	4.5 × 9.9 × 12.5	0.5	2222 469 25**224**
0.27	4.2 × 9.5 × 12.5	0.4	2222 469 25**274**
0.33	4.6 × 9.9 × 12.5	0.5	2222 469 25**334**
0.39	4.0 × 9.3 × 12.5	0.4	2222 469 25**394**
0.47	4.2 × 9.5 × 12.5	0.4	2222 469 25**474**
0.56	4.6 × 9.9 × 12.5	0.5	2222 469 25**564**
0.68	5.0 × 10.3 × 12.5	0.5	2222 469 25**684**
0.82	5.5 × 10.8 × 12.5	0.6	2222 469 25**824**
1.0	6.0 × 11.3 × 12.5	0.6	2222 469 25**105**

Metallized polyester film capacitors MKT 469

MKT 469 GENERAL DATA **PITCH 10 mm (straight leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

Fig.13 Outline.

Specific reference data for the 250 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
C ≤ 0.1 μF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 220 \times 10^{-4}$
0.1 μF < C ≤ 0.22 μF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 250 V (DC)	120 V/μs		
R between leads, for C ≤ 0.33 μF at 100 V; 1 minute	>30 000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30 000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	400 V; 1 minute		
Withstanding (DC) voltage between leads and case	500 V; 1 minute		

Available 250 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 4.0+1.0/−0.5 mm	±10%	2222 469 45...	on request
		±5%	2222 469 46...	on request
	l_t = 22.0 ±4.0 mm	±10%	2222 469 41...	on request
		±5%	2222 469 42...	on request
Taped on reel	H = 18.5 mm; P_0 = 12.7 mm	±10%	2222 469 48...	on request
		±5%	2222 469 49...	on request

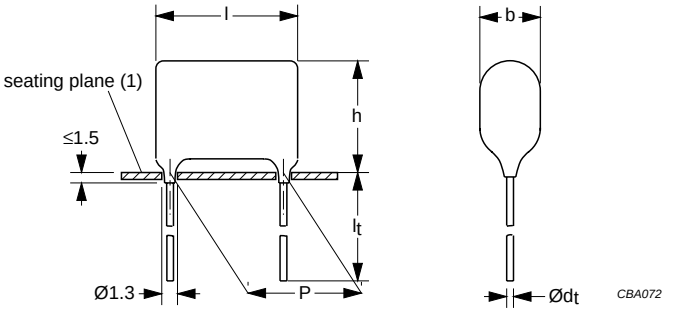
Metallized polyester film capacitors MKT 469

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER LOOSE IN BOX l_t = 4.0 +1.0/−0.5 mm C-tol = ±10%
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm			
0.027	4.2 × 9.5 × 12.5	0.4	2222 469 45**273**
0.033	4.6 × 9.9 × 12.5	0.5	2222 469 45**333**
0.039	4.0 × 9.3 × 12.5	0.4	2222 469 45**393**
0.047	4.1 × 9.4 × 12.5	0.4	2222 469 45**473**
0.056	4.0 × 9.3 × 12.5	0.4	2222 469 45**563**
0.068	4.1 × 9.4 × 12.5	0.4	2222 469 45**683**
0.082	4.4 × 9.7 × 12.5	0.5	2222 469 45**823**
0.1	4.0 × 9.3 × 12.5	0.4	2222 469 45**104**
0.12	4.3 × 9.7 × 12.5	0.5	2222 469 45**124**
0.15	4.8 × 10.1 × 12.5	0.5	2222 469 45**154**
0.18	5.2 × 10.5 × 12.5	0.5	2222 469 45**184**
0.22	5.8 × 11.1 × 12.5	0.6	2222 469 45**224**

Metallized polyester film capacitors MKT 469

MKT 469 GENERAL DATA **PITCH 10 mm (straight leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

Fig.14 Outline.

Specific reference data for the 400 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.1\ \mu F$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 400 V (DC)	170 V/μs		
R between leads, for $C \leq 0.33\ \mu F$ at 100 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	640 V; 1 minute		
Withstanding (DC) voltage between leads and case	800 V; 1 minute		

Available 400 V DC versions

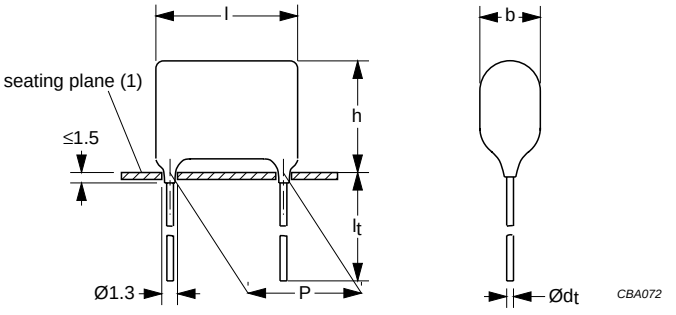
PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 4.0+1.0/–0.5 mm	±10%	2222 469 55...	on request
		±5%	2222 469 56...	on request
	l_t = 22.0 ±4.0 mm	±10%	2222 469 51...	on request
		±5%	2222 469 52...	on request
Taped on reel	H = 18.5 mm; P_0 = 12.7 mm	±10%	2222 469 58...	on request
		±5%	2222 469 59...	on request

U_{Rdc} = 400 V; U_{Rac} = 200 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER LOOSE IN BOX l_t = 4.0 +1.0/−0.5 mm C-tol = ±10%
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm			
0.001	4.5 × 9.9 × 12.5	0.5	2222 469 55**102**
0.0012			2222 469 55**122**
0.0015			2222 469 55**152**
0.0018			2222 469 55**182**
0.0022	4.0 × 9.3 × 12.5	0.4	2222 469 55**222**
0.0027	4.3 × 9.7 × 12.5	0.5	2222 469 55**272**
0.0033	4.6 × 9.9 × 12.5	0.5	2222 469 55**332**
0.0039	4.0 × 9.3 × 12.5	0.4	2222 469 55**392**
0.0047	4.1 × 9.5 × 12.5	0.4	2222 469 55**472**
0.0056	4.6 × 9.9 × 12.5	0.5	2222 469 55**562**
0.0068	4.2 × 9.5 × 12.5	0.4	2222 469 55**682**
0.0082	4.6 × 9.9 × 12.5	0.5	2222 469 55**822**
0.01	4.1 × 9.4 × 12.5	0.4	2222 469 55**103**
0.012	4.5 × 9.9 × 12.5	0.5	2222 469 55**123**
0.015	4.1 × 9.4 × 12.5	0.4	2222 469 55**153**
0.018	4.5 × 9.9 × 12.5	0.5	2222 469 55**183**
0.022	4.0 × 9.3 × 12.5	0.4	2222 469 55**223**
0.027	4.2 × 9.5 × 12.5	0.4	2222 469 55**273**
0.033	4.6 × 9.9 × 12.5	0.5	2222 469 55**333**
0.039	5.0 × 10.3 × 12.5	0.5	2222 469 55**393**
0.047	4.1 × 9.4 × 12.5	0.4	2222 469 55**473**
0.056	4.4 × 9.7 × 12.5	0.5	2222 469 55**563**
0.068	4.8 × 10.1 × 12.5	0.5	2222 469 55**683**
0.082	5.4 × 10.8 × 12.5	0.6	2222 469 55**823**
0.1	5.7 × 11.0 × 12.5	0.6	2222 469 55**104**

Metallized polyester film capacitors MKT 469

MKT 469 GENERAL DATA **PITCH 10 mm (straight leads)**



Dimensions in mm.

(1) Hole ∅1.0 for d_t = 0.6 mm.

Fig.15 Outline.

Specific reference data for the 630 V DC capacitors

DESCRIPTION	VALUE		
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz
$C \leq 0.033$ µF	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 630 V (DC)	120 V/µs		
R between leads, for $C \leq 0.33$ µF at 500 V; 1 minute	>30000 MΩ		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 MΩ		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1008 V; 1 minute		
Withstanding (DC) voltage between leads and case	1260 V; 1 minute		

Available 630 V DC versions

PACKAGING	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	l_t = 4.0+1.0/–0.5 mm	±10%	2222 469 65...	on request
		±5%	2222 469 66...	on request
	l_t = 22.0 ±4.0 mm	±10%	2222 469 61...	on request
		±5%	2222 469 62...	on request
Taped on reel	H = 18.5 mm; P_0 = 12.7 mm	±10%	2222 469 68...	on request
		±5%	2222 469 69...	on request

Metallized polyester film capacitors MKT 469

U_{Rdc} = 630 V; U_{Rac} = 250 V

C (μF)	DIMENSIONS $b_{max} \times h_{max} \times l_{max}$ (mm)	MASS (g)	CATALOGUE NUMBER LOOSE IN BOX l_t = 4.0 +1.0/−0.5 mm C-tol = ±10%
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm			
0.01	4.1 × 9.4 × 12.5	0.4	2222 469 65**103**
0.012	4.5 × 9.9 × 12.5	0.5	2222 469 65**123**
0.015	4.9 × 10.2 × 12.5	0.5	2222 469 65**153**
0.018	5.4 × 10.8 × 12.5	0.6	2222 469 65**183**
0.022	4.8 × 10.1 × 12.5	0.5	2222 469 65**223**
0.027	5.3 × 10.7 × 12.5	0.6	2222 469 65**273**
0.033	5.9 × 11.2 × 12.5	0.6	2222 469 65**333**

CONSTRUCTION

Description

- Low-inductive wound cell of metallized polyethylene terephthalate film
- Protected by a hard, water repellent, solvent resistant epoxy lacquer
- Radial leads, solder coated.

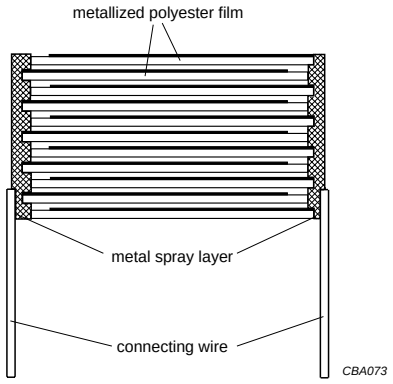


Fig.16 Construction:
MKT 100, 250, 400 and 630 V.

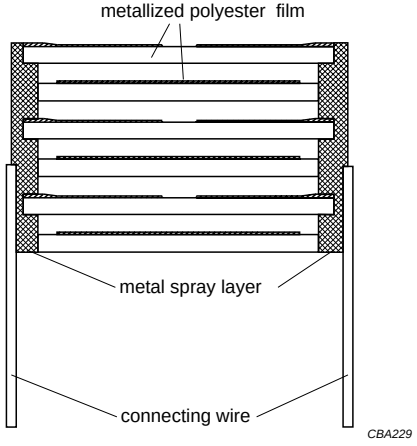


Fig.17 Construction: MKT/MKT 1000 V.

Mounting

NORMAL USE

The capacitors are designed for mounting on printed-circuit boards. The capacitors packed in bandoliers are designed for mounting on printed-circuit boards by means of automatic insertion machines.
For detailed tape specifications refer to this handbook, chapter *"Packaging information"*.

SPECIFIC METHOD OF MOUNTING TO WITHSTAND VIBRATION AND SHOCK

In order to withstand vibration and shock tests, it must be ensured that the underside of the crimps are in good contact with the printed-circuit board:

- For pitches ≤15 mm capacitors shall be mechanically fixed by the leads.
- For larger pitches the capacitors shall be mounted in the same way and the body clamped.

Storage temperature

- Storage temperature: T_{stg} = −25 to +40 °C with RH maximum 80% without condensation.

RATINGS AND CHARACTERISTICS REFERENCE CONDITIONS

Unless otherwise specified, all electrical values apply to an ambient free air temperature of 23 ±1 °C, an atmospheric pressure of 86 to 106 kPa and a relative humidity of 50 ±2%.

For reference testing, a conditioning period shall be applied over 96 ±4 hours by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20%.

CHARACTERISTICS

Capacitance

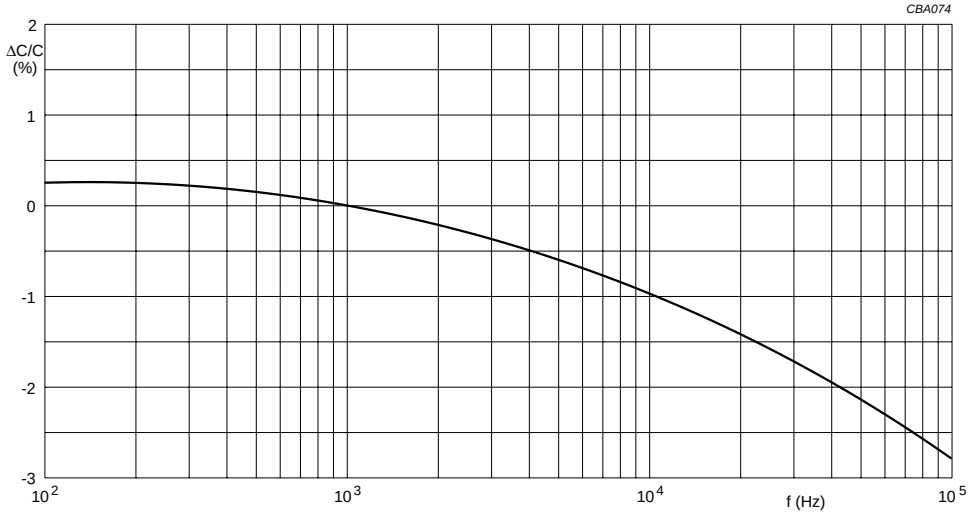


Fig.18 Capacitance change as a function of frequency: typical curve.

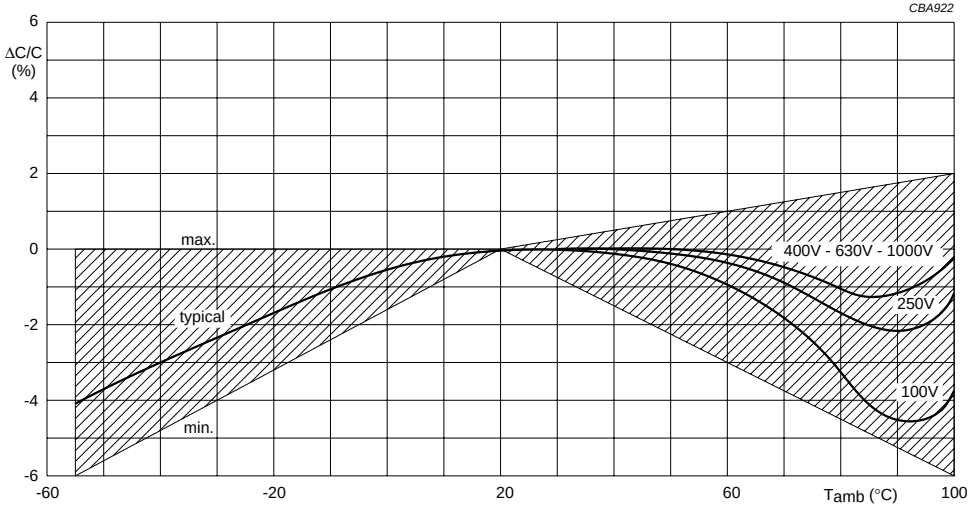


Fig.19 Capacitance as a function of ambient free air temperature, measured at 1 kHz, 1 V.

Impedance

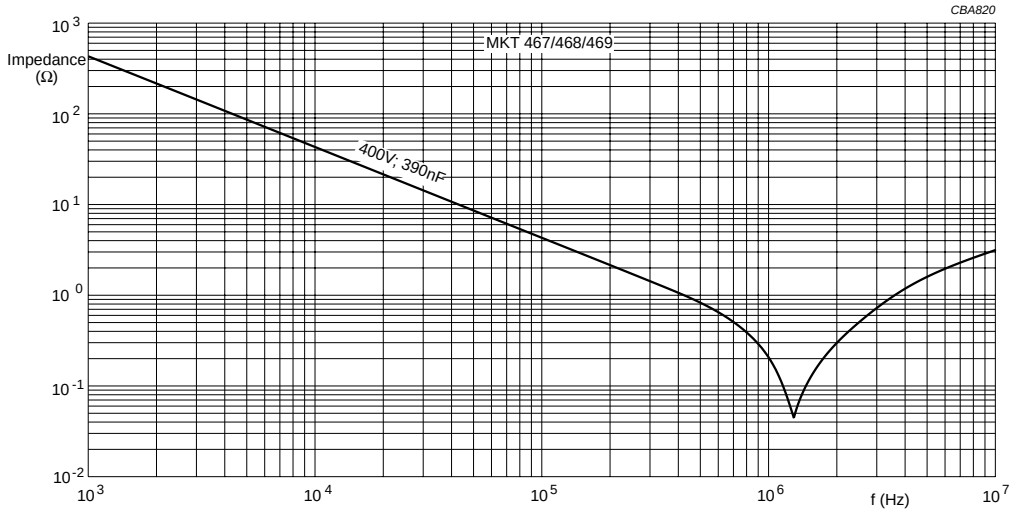


Fig.20 Impedance as a function of frequency: typical curve.

Maximum DC and AC voltage as a function of temperature

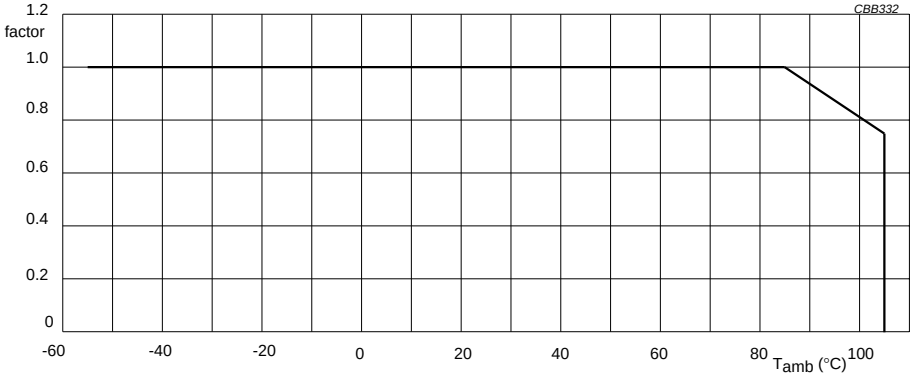


Fig.21 Multiplying factor for DC and AC voltage as a function of temperature.

Maximum RMS voltage and AC current (sinewave) as a function of frequency

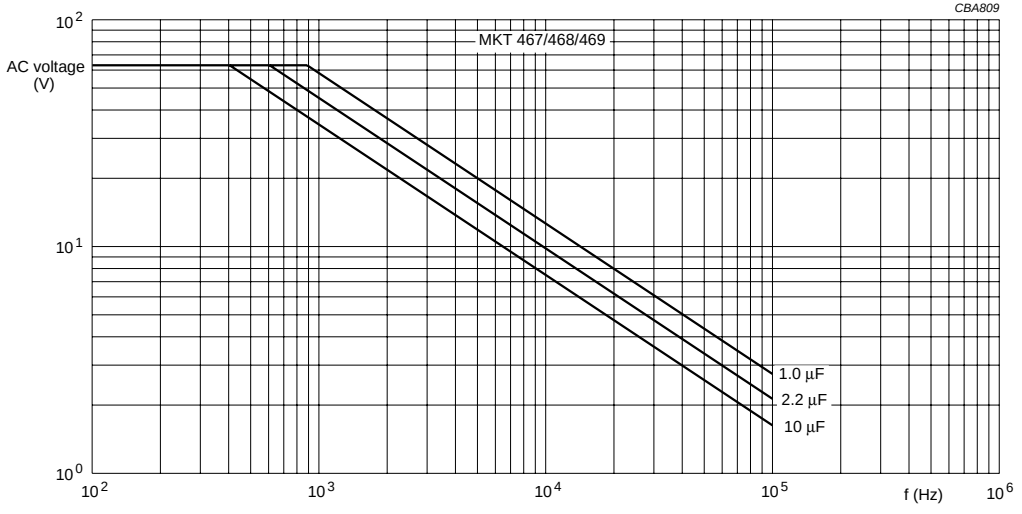


Fig.22 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 100$ V.

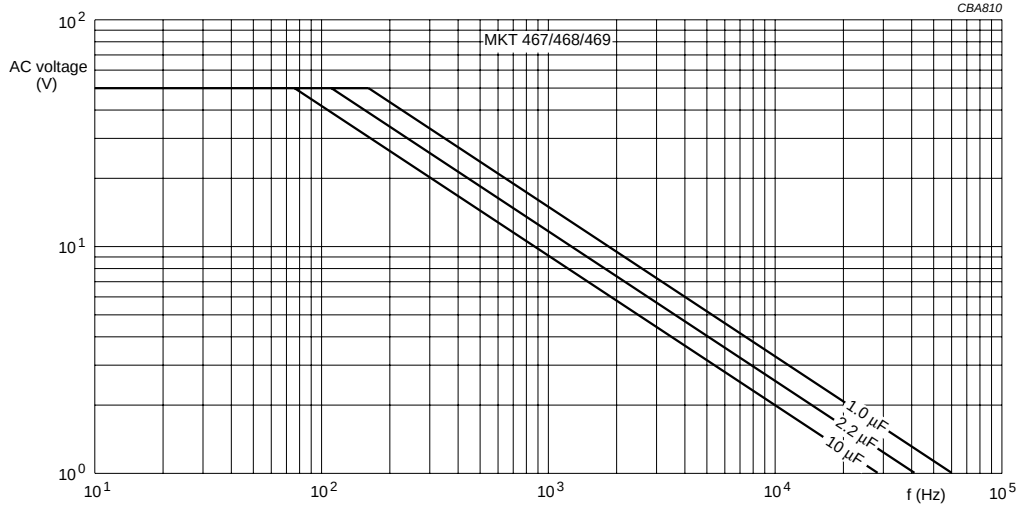


Fig.23 AC voltage (RMS value) as a function of frequency at 85 °C < $T_{amb} \leq 105$ °C for $U_{Rdc} = 100$ V.

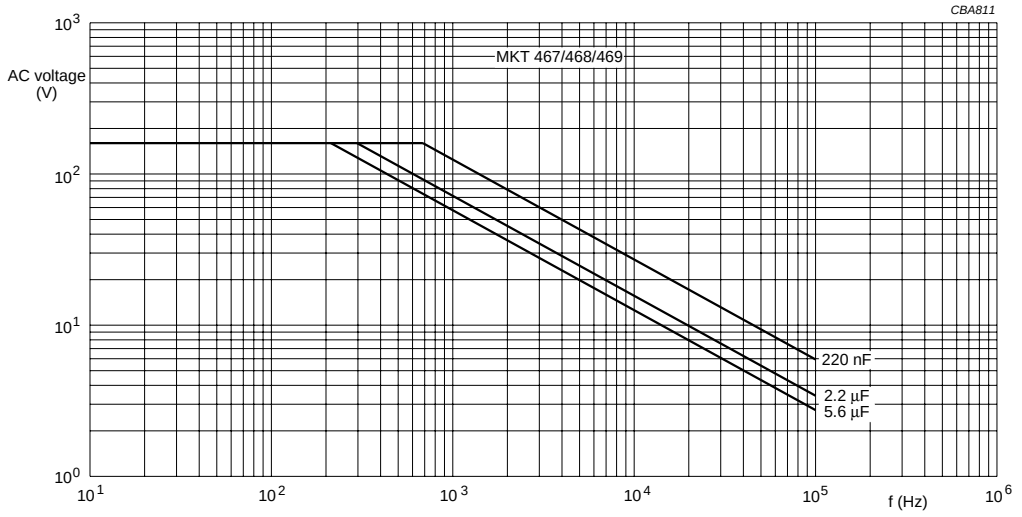


Fig.24 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 250$ V.

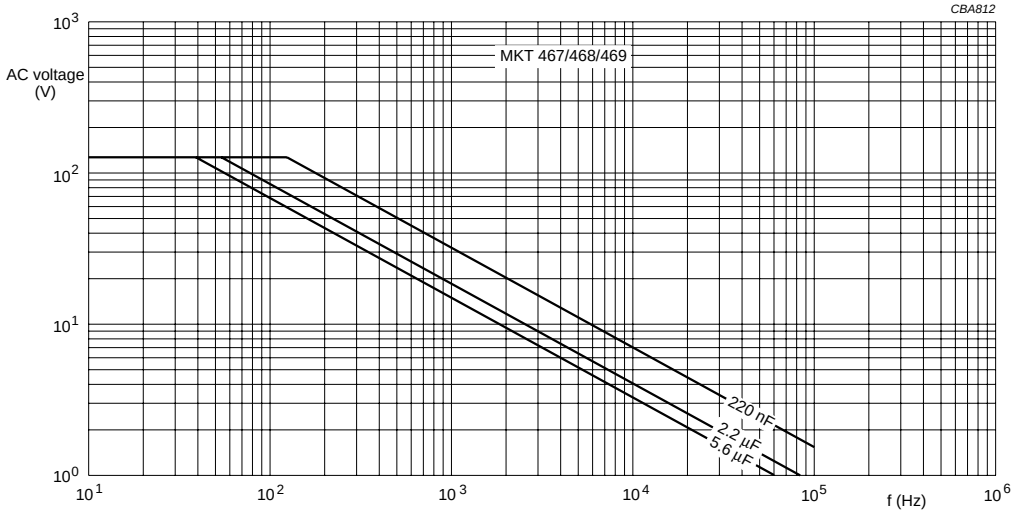


Fig.25 AC voltage (RMS value) as a function of frequency at 85 °C < $T_{amb} \leq 105$ °C for $U_{Rdc} = 250$ V.

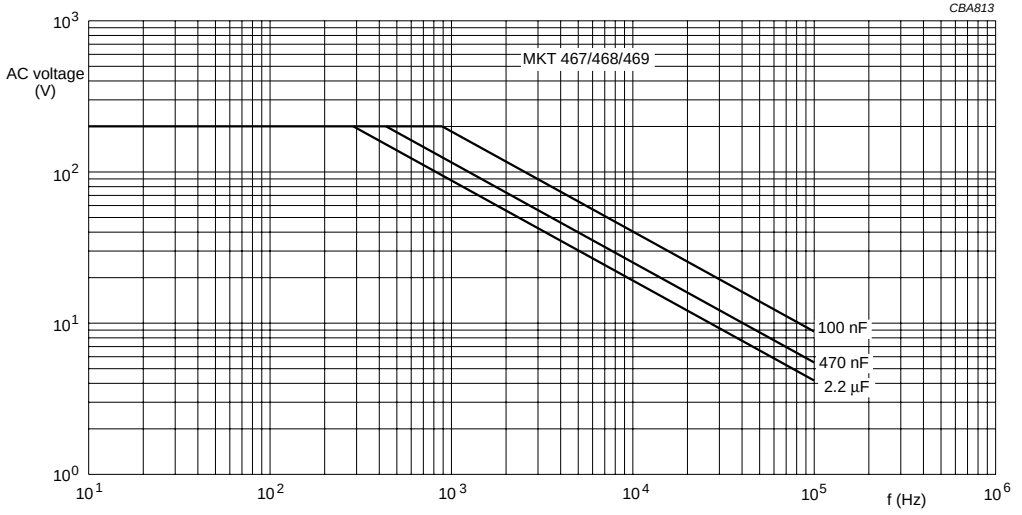


Fig.26 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 400$ V.

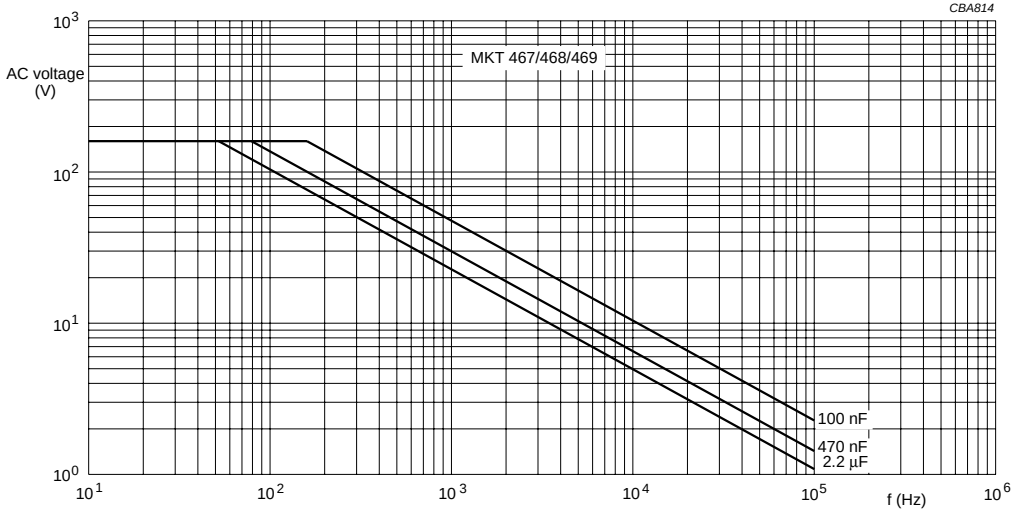


Fig.27 AC voltage (RMS value) as a function of frequency at 85 °C < $T_{amb} \leq 105$ °C for $U_{Rdc} = 400$ V.

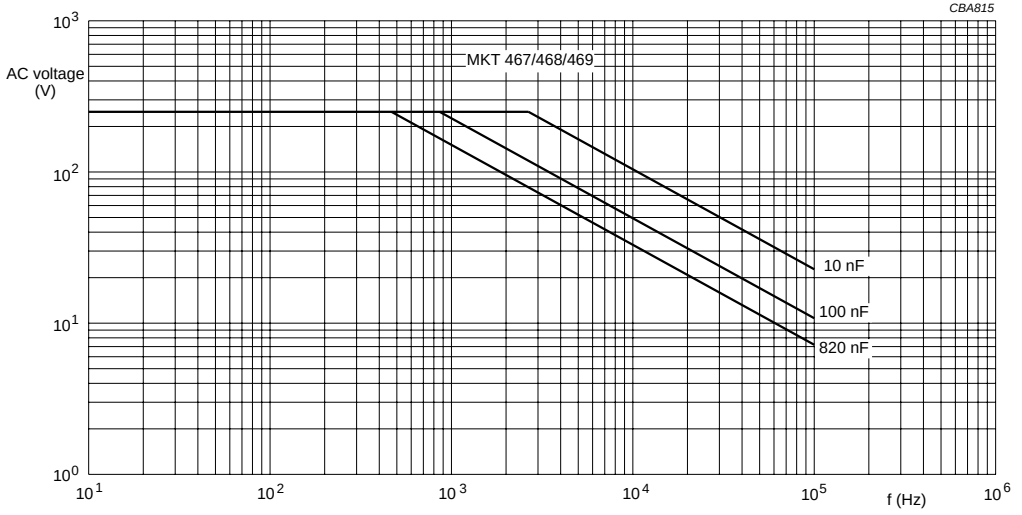


Fig.28 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 630$ V.

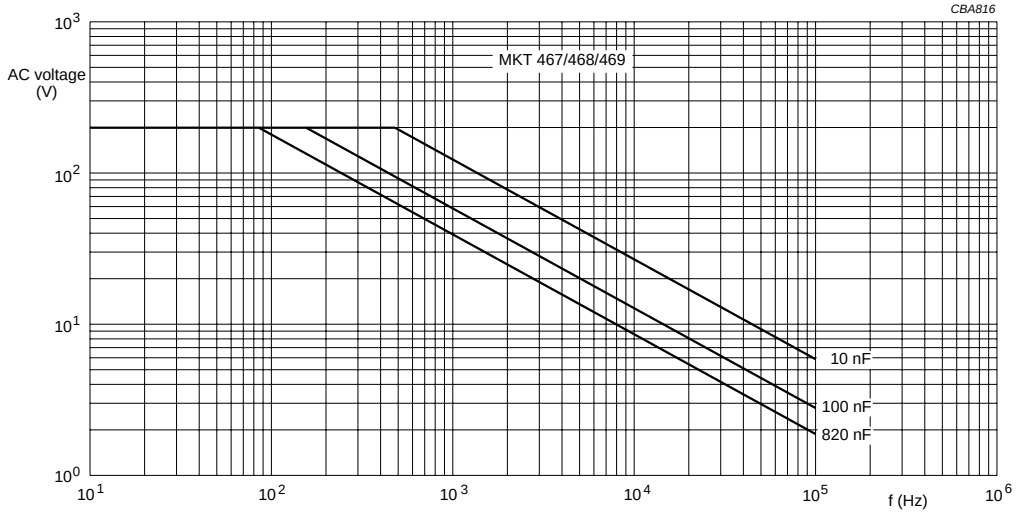


Fig.29 AC voltage (RMS value) as a function of frequency at 85 °C < $T_{amb} \leq 105$ °C for $U_{Rdc} = 630$ V.

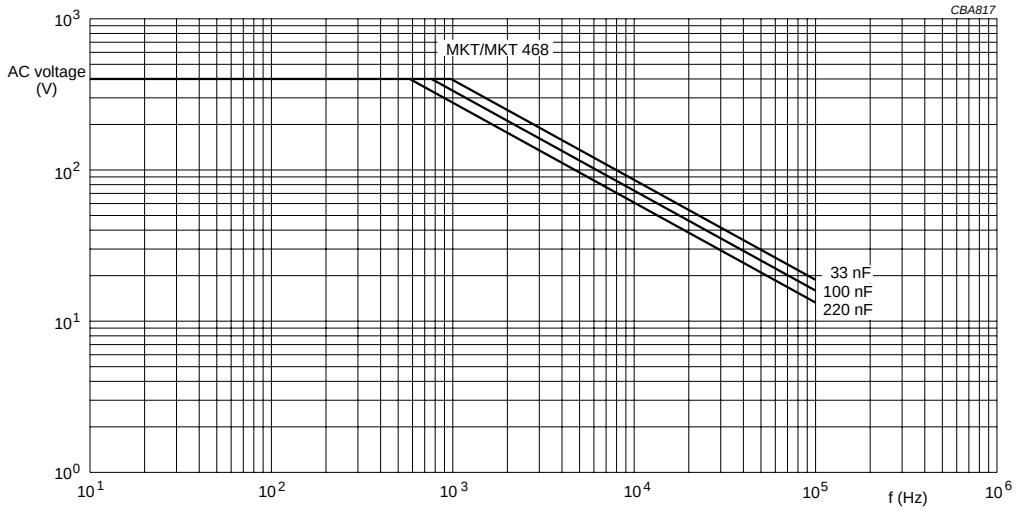


Fig.30 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 1000$ V.

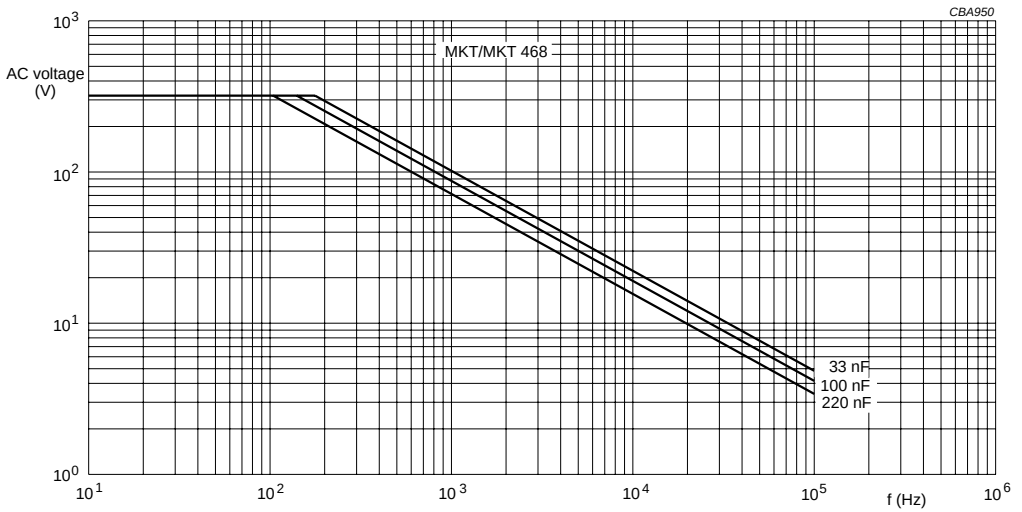


Fig.31 AC voltage (RMS value) as a function of frequency at 85 °C < $T_{amb} \leq 105$ °C for $U_{Rdc} = 1000$ V.

Maximum RMS current (sinewave) as a function of frequency

The maximum RMS current is defined by $I_{ac} = \omega \times C \times U_{ac}$.

U_{ac} is the maximum AC voltage depending on the ambient temperature in Figs 22 to 31.

Tangent of loss angle

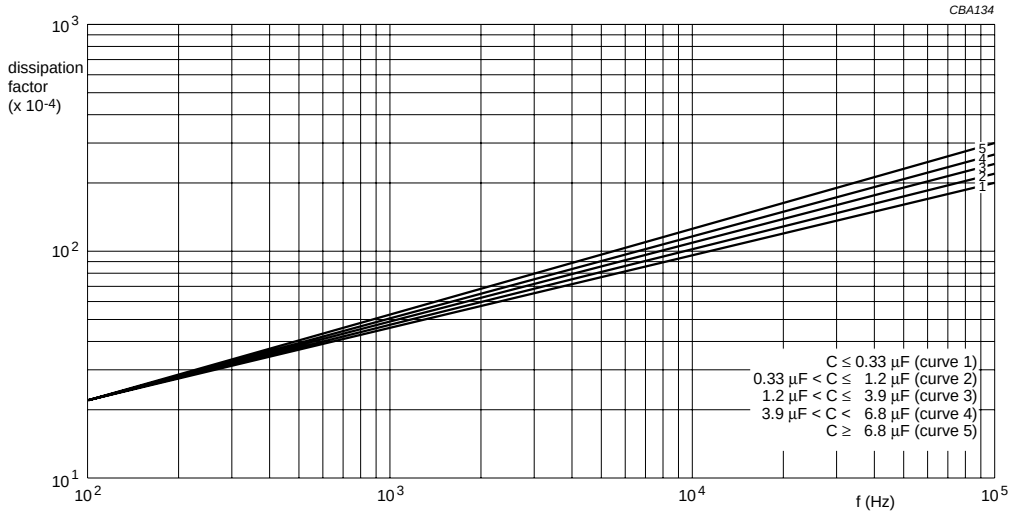


Fig.32 Tangent of loss angle as a function of frequency: typical curve.

Insulation resistance

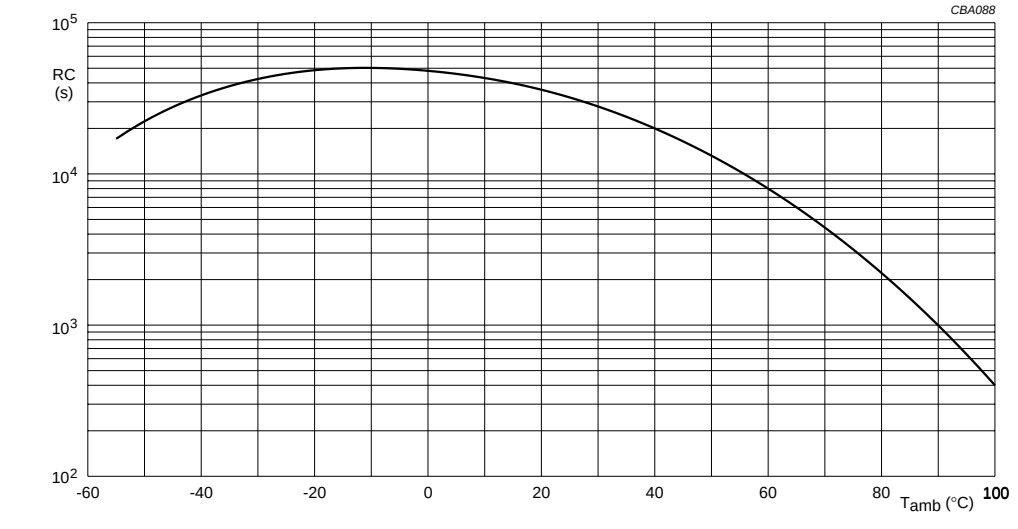


Fig.33 RC product as a function of ambient free air temperature: typical curve.

Maximum allowed component temperature rise (ΔT) as a function of the ambient temperature (T_{amb})

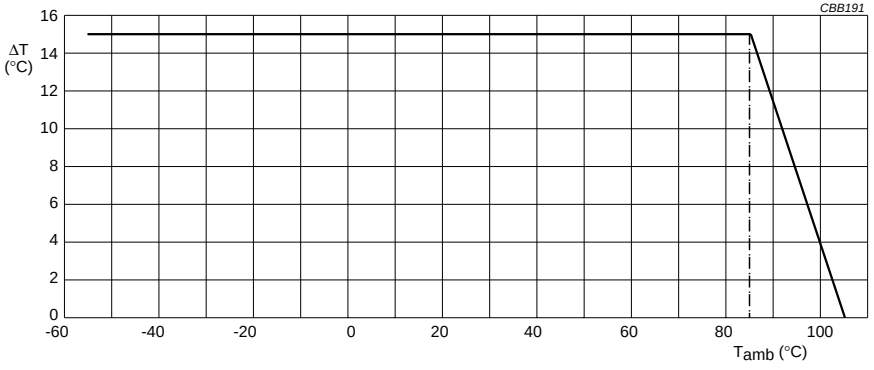


Fig.34 Maximum allowed component temperature rise as a function of the ambient temperature.

Heat conductivity (G) as a function of pitch and capacitor body thickness in mW/°C

Table 1 Heat conductivity

b_{max} (mm)	ORIGINAL PITCH (mm)			
	10	15	22.5	27.5
4.0	4.0	5.0	–	–
4.5	4.5	6.0	–	–
5.0	5.0	6.0	12.0	13.0
5.5	6.0	6.5	13.0	15.0
6.0	6.0	6.5	13.0	15.0
6.5	6.5	8.0	15.0	17.0
7.0	–	8.0	15.0	17.0
7.5	–	9.0	17.0	18.0
8.0	–	9.0	17.0	20.0
8.5	–	11.0	18.0	20.0
9.0	–	11.0	18.0	22.0
9.5	–	12.0	20.0	22.0
10.0	–	12.0	20.0	23.0
10.5	–	–	22.0	25.0
11.0	–	–	–	25.0
11.5	–	–	–	27.0
12.0	–	–	–	27.0
12.5	–	–	–	30.0
13.0	–	–	–	30.0
13.5	–	–	–	30.0
14.0	–	–	–	30.0
14.5	–	–	–	33.0
15.0	–	–	–	33.0
15.5	–	–	–	37.0
16.0	–	–	–	37.0

Power dissipation and maximum component temperature rise

The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as a function of the free air ambient temperature.

The power dissipation can be calculated according chapter *"Introduction"*, section *"Maximum power dissipation"*.

The component temperature rise (ΔT) can be measured (see section "Measuring the component temperature" for more details) or calculated by $\Delta T = P/G$:

- ΔT = component temperature rise (°C).
- P = power dissipation of the component (mW).
- G = heat conductivity of the component (mW/°C).

Measuring the component temperature

A thermocouple must be attached to the capacitor body as in Fig.35.

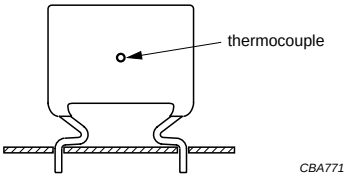


Fig.35 Mounting the thermocouple.

The temperature is measured in unloaded (T_{amb}) and maximum loaded condition (T_c).

The temperature rise is given by $\Delta T = T_c - T_{amb}$.

To avoid radiation or convection, the capacitor should be tested in a wind-free box.

Application note and limiting conditions

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described hereunder. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

1. The peak voltage (U_p) shall not be greater than the rated DC voltage (U_{Rdc}).
2. The peak-to-peak voltage (U_{p-p}) shall not be greater than the maximum U_{p-p} to avoid the ionisation inception level.
3. The voltage pulse slope (dU/dt) shall not exceed the rated voltage pulse slope in an RC-circuit at rated voltage and without ringing. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by U_{Rdc} and divided by the applied voltage.

   For all other pulses following equation must be fulfilled:

   $$2 \times \int_0^T \left(\frac{dU}{dt}\right)^2 \times dt < U_{Rdc} \times \left(\frac{dU}{dt}\right)_{rated}$$

   T is the pulse duration.

   The rated voltage pulse slope is valid for ambient temperatures up to 85 °C. For higher temperatures a derating factor of 3% per K shall be applied.
4. The maximum component surface temperature rise must be lower than the limits in Fig.34.
5. Since in circuits used at voltages over 280 V peak-to-peak the risk for an intrinsically active flammability after a capacitor breakdown (short circuit) increases, it is recommended that the power to the component is limited to 100 times the values mentioned in Table 1 “Heat conductivity”.
6. When using these capacitors as across-the-line capacitor in the input filter for mains applications or as series connected with an impedance to the mains the applicant must guarantee that following conditions are fulfilled in any case (spikes and surge voltages from the mains included):

VOLTAGE CONDITIONS FOR 6 ABOVE

ALLOWED VOLTAGES	$T_{amb} \leq 85$ °C	85 °C $< T_{amb} \leq 105$ °C
Maximum continuous RMS voltage	U_{Rac}	$0.8 \times U_{Rac}$
Maximum temporary RMS -overvoltage (<24 hours)	$1.25 \times U_{Rac}$	$1.0 \times U_{Rac}$
Maximum peak voltage (V_{o-p}) (<2 s)	$1.6 \times U_{Rdc}$	$1.3 \times U_{Rdc}$

Example

C = 3300 nF - 100 V used for the voltage signal shown in Fig.36.

U_{p-p} = 80 V; U_p = 70 V; T_1 = 0.5 ms; T_2 = 1 ms.

The ambient temperature is 35 °C.

Checking the conditions:

1. The peak voltage U_p = 70 V is lower than 100 V (DC).
2. The peak-to-peak voltage 80 V is lower than $2 \times \sqrt{2} \times 63\ V(AC) = 178\ U_{p-p}$.
3. The voltage pulse slope dU/dt = 80 V/500 µs = 0.16 V/ µs.
   This is lower than 20 V/µs (see specific reference data for each version).
4. The dissipated power is 60 mW as calculated with Fourier terms.
   The temperature rise for b_{max} = 8.5 mm and pitch = 15 mm will be $\frac{60\ mW}{11\ mW/°C} = 5.5\ °C$.
   This is lower than 15 °C temperature rise at 35 °C; see Fig.34.
5. Not applicable.
6. Not applicable.

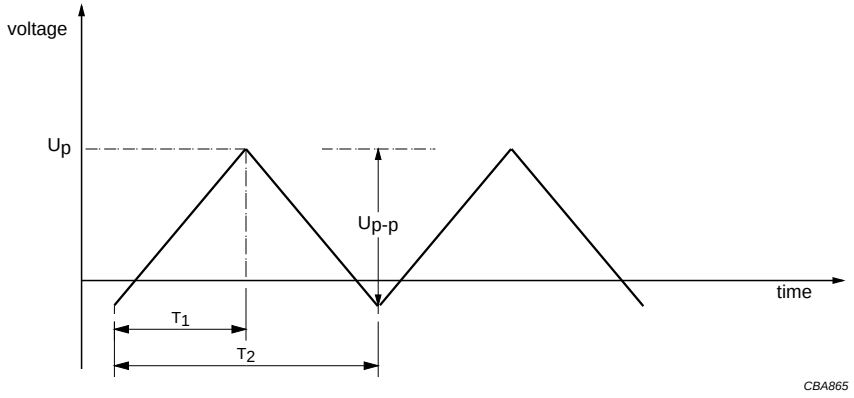


Fig.36 Voltage signal.

MARKING

Product marking

STYLE MKT 467/468/469

Capacitors with original pitch = 10 mm

The capacitors are marked on the top or on the side (for typical example see Fig.37), with the following information:

1. Rated capacitance code in nF, µF or in accordance with *"IEC 60062"*
2. Tolerance on rated capacitance: K = ±10%; J = ±5%
3. Rated voltage (DC).

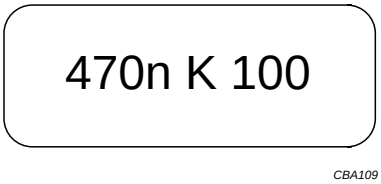


Fig.37 Typical example of marking for a capacitor with original pitch = 10 mm.

Capacitors with original pitch = 15, 22.5 and 27.5 mm

The capacitors are marked on the top or on the side (for typical examples see Fig.38), with the following information:

1. Manufacturer's symbol
2. Rated capacitance code in nF, µF or in accordance with *"IEC 60062"*
3. Tolerance on rated capacitance: K = ±10%; J = ±5%
4. Rated voltage (DC).

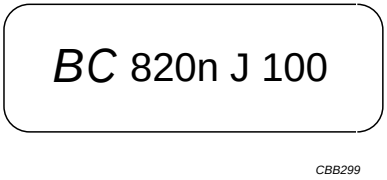


Fig.38 Typical example of marking for a capacitor with original pitch = 15, 22.5 and 27.5 mm.

STYLE MKT/MKT 468

The capacitors are marked on the top or on the side (for typical example see Fig.39) with the following information:

1. Manufacturer's symbol.
2. Rated capacitance code in nF, µF or in accordance with *"IEC 60062"*
3. Tolerance on rated capacitance: K = ±10%; J = ±5%
4. Rated voltage (DC)
5. Code for dielectric material and construction (MKT/MKT).

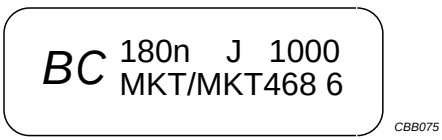
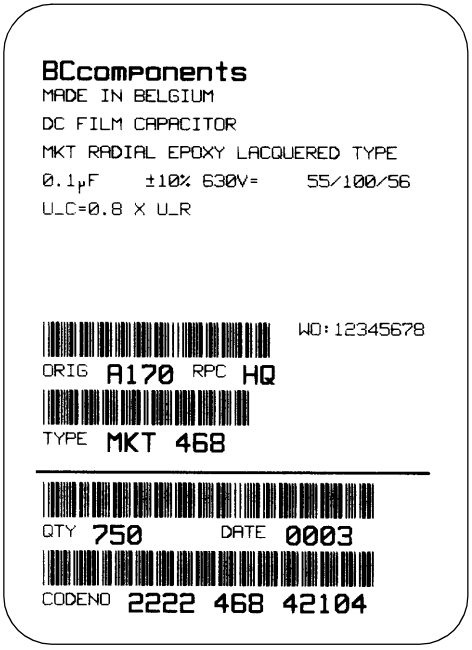


Fig.39 Typical example of marking.

Package marking

The package containing the capacitors is marked as shown in Fig.40.



Barcode label marking

LINE	MARKING EXPLANATION
1	Manufacturer's name
2	Country of origin
3	Sub-family
4	Type description
5	Capacitance value, tolerance, voltage and climatic category (*"IEC 60068-1"*)
6	Batchnumber (only for capacitors from PRC)
7	• Country of origin: Belgium Preference origin code: A Country of origin in code: 170 (Belgium) Responsible production centre: HQ Work order: WO • Country of origin: China Preference origin code: N Country of origin in code: 260 (PRC) Responsible production centre: 07
8	Product type description
9	Quantity and production period, year and week code
10	Product code (12NC)

Fig.40 Barcode label.

QUICK REFERENCE TEST REQUIREMENTS

TEST	PROCEDURE (quick reference)	REQUIREMENTS
Robustness of leads		
Tensile: *"IEC 60068-2-21"*	load 10 N; 10 s	no visible damage legible marking $\lvert\Delta C/C\rvert \leq 2\%$ $\Delta\tan\delta \leq 30 \times 10^{-4}$; note 1
Bending: *"IEC 60068-2-21"*	load 5 N; 4 × 90 °	
Resistance to soldering heat *"IEC 60068-2-20"*	solder bath: 260 °C; 10 s	
Resistance to solvents	isopropyl alcohol; 23 °C; 5 minutes	
Robustness of component		
Vibration: *"IEC 60068-2-6"*	10 to 55 Hz; amplitude 0.75 mm or acceleration 98 m/s^2; 6 hours	$\lvert\Delta C/C\rvert \leq 3\%$ $\Delta\tan\delta \leq 30 \times 10^{-4}$; note 1
Shock: *"IEC 60068-2-27"*	half sinewave; 490 m/s^2; 11 ms	
Climatic sequence		
Dry heat: *"IEC 60068-2-2"*	16 hours; 105 °C	$\lvert\Delta C/C\rvert \leq 5\%$ $\Delta\tan\delta \leq 50 \times 10^{-4}$; note 1 $R_{ins} \geq 50\%$ of specified value
Damp heat cyclic, test Db, first cycle: *"IEC 60068-2-30"*		
Cold: *"IEC 60068-2-1"*	2 hours; −55 °C	
Damp heat cyclic, test Db, remaining cycles: *"IEC 60068-2-30"*		
Other applicable tests		
Damp heat, steady state: *"IEC 60068-2-3"*	56 days; 40 °C; 90 to 95% RH	$\lvert\Delta C/C\rvert \leq 5\%$ $\Delta\tan\delta \leq 50 \times 10^{-4}$; note 1 $R_{ins} \geq 50\%$ of specified value
Endurance (DC): *"IEC 60384-2"*	2000 hours: $1.25 \times U_{Rdc}$; 85 °C $1 \times U_{Rdc}$; 105 °C	$\lvert\Delta C/C\rvert \leq 5\%$ $\Delta\tan\delta \leq 30 \times 10^{-4}$; note 1 $R_{ins} \geq 50\%$ of specified value
Heat storage: *"IEC 60384-2"*	2000 hours; 105 °C	$\lvert\Delta C/C\rvert \leq 3\%$ $\Delta\tan\delta \leq 30 \times 10^{-4}$; note 1
Resistance to soldering heat with preheating: *"IEC 60384-2"*	body temperature: 100 °C; bath temperature: 260 °C; dwell time: 10 s	$\lvert\Delta C/C\rvert \leq 2\%$ $\Delta\tan\delta \leq 30 \times 10^{-4}$; note 1

Note

1. Measuring frequency 10 kHz.