



**Electromagnetic Interference Suppression Capacitors
Class X2 305/310VAC**

Across - The - Line Capacitors

TECHNICAL SPECIFICATION

Metallized Polypropylene Film Capacitors (MKP)

Type: KNB1580

RoHS compliant

Approvals: **ENEC - IEC, c-UL-us, CQC**



Issue: **January 2020**

ISKRA, d.o.o.

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CO_RAK301_0201


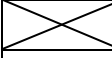
material			protection		standard			issue			 Iskra [®] Iskra, d.o.o. PE Kondenzatorji			
changes	1	2	3	4	5	6	7	8	9	10				
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design	date	sign.	TECHNICAL SPECIFICATION Metallized Polypropylene Film Capacitors (MKP) Type KNB1580 305/310VAC Class X2 <i>RoHS compliant</i>								identification No.			
design	22.1.20	Šuklje									scale		page	
approv.	22.1.20	Dermol											1/18	
stand.														

3. Dimensions

C _R (μF)	Cap. tol. ±(%)	L (mm)	H (mm)	W (mm)	PCM (mm)	Ø (mm)	Approvals		
							ENEC-VDE	UL, cUL	CQC
0.01	5, 10, 20	13	9	4	10	0.6	●	●	●
0.012	5, 10, 20	13	9	4	10	0.6	○	○	○
0.015	5, 10, 20	13	9	4	10	0.6	●	●	●
0.018	5, 10, 20	13	9	4	10	0.6	○	○	○
0.022	5, 10, 20	13	9	4	10	0.6	●	●	●
0.027	5, 10, 20	13	9	4	10	0.6	○	○	○
0.033	5, 10, 20	13	9	4	10	0.6	●	●	●
0.033	5, 10, 20	13	10.5	5	10	0.6	●	●	●
0.039	5, 10, 20	13	10.5	5	10	0.6	○	○	○
0.047	5, 10, 20	13	10.5	5	10	0.6	●	●	●
0.047	5, 10, 20	13	11.5	6	10	0.6	●	●	●
0.056	5, 10, 20	13	11	5.5	10	0.6	○	○	○
0.068	5, 10, 20	13	11	5.5	10	0.6	●	●	●
0.082	5, 10, 20	13	12	6	10	0.6	○	○	○
0.1	5, 10, 20	13	12	6	10	0.6	●	●	●
0.01	5, 10, 20	18	11	5	15	0.8	●	●	●
0.012	5, 10, 20	18	11	5	15	0.8	○	○	○
0.015	5, 10, 20	18	11	5	15	0.8	●	●	●
0.018	5, 10, 20	18	11	5	15	0.8	○	○	○
0.022	5, 10, 20	18	11	5	15	0.8	●	●	●
0.027	5, 10, 20	18	11	5	15	0.8	○	○	○
0.033	5, 10, 20	18	11	5	15	0.8	●	●	●
0.039	5, 10, 20	18	11	5	15	0.8	○	○	○
0.047	5, 10, 20	18	11	5	15	0.8	●	●	●
0.047 +R	5, 10, 20	18	12	6	15	0.8	○	○	○
0.056	5, 10, 20	18	11	5	15	0.8	○	○	○
0.056 +R	5, 10, 20	18	12	6	15	0.8	○	○	○
0.068	5, 10, 20	18	11	5	15	0.8	●	●	●
0.068 +R	5, 10, 20	18	12	6	15	0.8	○	○	○
0.082	5, 10, 20	18	11	5.5	15	0.8	○	○	○
0.082 +R	5, 10, 20	18	13	7	15	0.8	○	○	○
0.1	5, 10, 20	18	11	5.5	15	0.8	●	●	●
0.1 +R	5, 10, 20	18	13	7	15	0.8	○	○	○
0.12	5, 10, 20	18	12	6	15	0.8	●	●	●
0.12 +R	5, 10, 20	18	13	7	15	0.8	○	○	○
0.15	5, 10, 20	18	13	7	15	0.8	●	●	●
0.15 +R	5, 10, 20	18	14.5	8.2	15	0.8	○	○	○
0.18	5, 10, 20	18	13.5	7.5	15	0.8	○	○	○
0.18 +R	5, 10, 20	18	16.5	8.5	15	0.8	○	○	○
0.22	5, 10, 20	18	14.5	8.2	15	0.8	●	●	●
0.22 +R	5, 10, 20	18	16.5	8.5	15	0.8	○	○	○
0.27	5, 10, 20	18	14.5	9	15	0.8	●	●	●
0.27 +R	5, 10, 20	18	18.5	11	15	0.8	○	○	○
0.33	5, 10, 20	18	16	9.5	15	0.8	●	●	●
0.33 +R	5, 10, 20	18	18.5	11	15	0.8	○	○	○
0.47	5, 10, 20	18	18.5	11	15	0.8	●	●	●
0.47 +R	20	18	20	12.5	15	0.8	○	○	○
0.56	5, 10, 20	18	20	12.5	15	0.8	●	●	●


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material		protection		standard			issue			 Iskra, d.o.o. PE Kondenzatorji	
changes	1	2	3	4	5	6	7	8	9		10
request.											
date											
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	date	sign.	name							identification No.	
design	22.1.20	Šuklje	TECHNICAL SPECIFICATION Metallized Polypropylene Film Capacitors (MKP) Type KNB1580 305/310VAC Class X2 <i>RoHS compliant</i>							scale	page
approv.	22.1.20	Dermol									
stand.											

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C _R (μF)	Cap. tol. ±(%)	L (mm)	H (mm)	W (mm)	PCM (mm)	Ø (mm)	Approvals		
							ENEC-VDE	UL, cUL	CQC
0.15	5, 10, 20	26.5	14	6	22.5	0.8	●	●	●
0.18	5, 10, 20	26.5	14	6	22.5	0.8	○	○	○
0.22	5, 10, 20	26.5	14	6	22.5	0.8	●	●	●
0.22 +R	5, 10, 20	26.5	16	7	22.5	0.8	○	○	○
0.27	5, 10, 20	26.5	15	6	22.5	0.8	●	●	●
0.27 +R	5, 10, 20	26.5	17	8.5	22.5	0.8	○	○	○
0.33	5, 10, 20	26.5	16	7	22.5	0.8	●	●	●
0.33 +R	5, 10, 20	26.5	16.5	8.5	22.5	0.8	○	○	○
0.47	5, 10, 20	26.5	17	8.5	22.5	0.8	●	●	●
0.47 +R	20	26.5	18.5	9	22.5	0.8	○	○	○
0.47 +R	5, 10, 20	26.5	18.5	10	22.5	0.8	○	○	○
0.56	5, 10, 20	26.5	18.5	9	22.5	0.8	●	●	●
0.56 +R	5, 10, 20	26.5	21.5	12.5	22.5	0.8	○	○	○
0.68	5, 10, 20	26.5	18.5	10	22.5	0.8	●	●	●
0.68 +R	5, 10, 20	26.5	20.5	11	22.5	0.8	○	○	○
0.82	5, 10, 20	26.5	20.5	11	22.5	0.8	○	○	○
0.82 +R	5, 10, 20	26.5	21.5	12.5	22.5	0.8	○	○	○
1	5, 10, 20	26.5	21.5	12.5	22.5	0.8	●	●	●
0.47	5, 10, 20	31.5	16	7.5	27.5	0.8	●	●	●
0.47 +R	5, 10, 20	31.5	17	9	27.5	0.8	○	○	○
0.56	5, 10, 20	31.5	17	9	27.5	0.8	●	●	●
0.56 +R	5, 10, 20	31.5	19	10	27.5	0.8	○	○	○
0.68	5, 10, 20	31.5	17	9	27.5	0.8	●	●	●
0.68 +R	5, 10, 20	31.5	19	10	27.5	0.8	○	○	○
0.82	5, 10, 20	31.5	19	10	27.5	0.8	○	○	○
0.82 +R	5, 10, 20	31.5	20	11	27.5	0.8	○	○	○
1	5, 10, 20	32	20	11	27.5	0.8	●	●	●
1 +R	20	31.5	21	12	27.5	0.8	○	○	○
1 +R	5, 10, 20	31.5	22	13	27.5	0.8	○	○	○
1.2	5, 10, 20	31.5	21	12	27.5	0.8	○	○	○
1.2 +R	5, 10, 20	31.5	22	13	27.5	0.8	○	○	○
1.2 +R	5, 10, 20	31.5	23.5	14	27.5	0.8	○	○	○
1.5	5, 10, 20	31.5	23.5	14	27.5	0.8	●	●	●
1.5 +R	20	31.5	23.5	14	27.5	0.8	○	○	○
1.5 +R	5, 10, 20	31.5	24.5	15	27.5	0.8	○	○	○
1.8	5, 10, 20	31.5	24.5	15	27.5	0.8	○	○	○
1.8 +R	5, 10, 20	31.5	26.5	17	27.5	0.8	○	○	○
2.2	5, 10, 20	31.5	26.5	17	27.5	0.8	●	●	●
2.2 +R	20	31.5	26.5	17	27.5	0.8	○	○	○
2.2 +R	5, 10, 20	32	28	18	27.5	0.8	○	○	○
2.7	5, 10, 20	31.5	32	18	27.5	0.8	●	●	●
2.7 +R	5, 10, 20	31.5	32	18	27.5	0.8	○	○	○
3.3	5, 10, 20	31.5	32	18	27.5	0.8	●	●	●
3.3	5, 10, 20	32	33	20	27.5	0.8	●	●	●
3.3 +R	20	31.5	32	18	27.5	0.8	○	○	○
3.3 +R	20	31.5	33	20	27.5	0.8	○	○	○
3.3 +R	5, 10, 20	31.5	35	20	27.5	0.8	○	○	○
3.9	20	32	33	20	27.5	0.8	●	●	●
3.9 +R	5, 10, 20	32	35.5	24	27.5	0.8	○	○	○
4.7	20	32	39	20	27.5	0.8	●	●	●
4.7	5, 10, 20	32	39	24	27.5	0.8	●	●	●
4.7 +R	20	32	39	20	27.5	0.8	○	○	○
4.7 +R	5, 10, 20	32	39	24	27.5	0.8	○	○	○

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design	22.1.20	Šuklje								scale	page
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stand.											

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C _R (μF)	Cap. tol. ±(%)	L (mm)	H (mm)	W (mm)	PCM (mm)	Ø (mm)	Approvals		
							ENEC-VDE	UL, cUL	CQC
5.6	5, 10, 20	32	39	24	27.5	0.8	●	●	●
5.6 +R	20	32	40	25	27.5	0.8	○	○	○
1.5	5, 10, 20	41.5	22	14	37.5	0.8	●	●	●
1.5 +R	5, 10, 20	41.5	23	14	37.5	0.8	○	○	○
1.8	5, 10, 20	41.5	23	14	37.5	0.8	○	○	○
1.8 +R	5, 10, 20	41.5	25	14	37.5	0.8	○	○	○
2.2	5, 10, 20	41.5	23	14	37.5	0.8	●	●	●
2.2 +R	5, 10, 20	41.5	26	18	37.5	0.8	○	○	○
3.3	5, 10, 20	41.5	26	18	37.5	0.8	●	●	●
3.3 +R	5, 10, 20	41.5	31	18	37.5	0.8	○	○	○
3.9	5, 10, 20	41.5	31	18	37.5	0.8	●	●	●
3.9 +R	5, 10, 20	41.5	32	19	37.5	0.8	○	○	○
4.7	5, 10, 20	41.5	32	19	37.5	0.8	●	●	●
4.7 +R	5, 10, 20	41.5	38	21	37.5	0.8	○	○	○
5.6	5, 10, 20	41.5	38	21	37.5	1	●	●	●
5.6 +R	5, 10, 20	41.5	38	21	37.5	1	○	○	○
6.8	5, 10, 20	41.5	38	21	37.5	1	●	●	●
6.8 +R	20	41.5	38	21	37.5	1	○	○	○
6.8 +R	20	41.5	38	21	37.5	1	○	○	○
6.8 +R	20	42	40	21	37.5	1	○	○	○
6.8 +R	5, 10, 20	42	43	28	37.5	1	○	○	○
8.2	5, 10, 20	42	43	28	37.5	1	●	●	●
8.2 +R	20	42	43	28	37.5	1	○	○	○
10	20	42	43	28	37.5	1	●	●	●
10	5, 10, 20	42	45	30	37.5	1	●	●	●
10 +R	5, 10, 20	42	45	30	37.5	1	○	○	○
12	5, 10, 20	42	50	36	37.5	1	○	○	○
12 +R	5, 10, 20	42	50	36	37.5	1	○	○	○
15	5, 10, 20	42	50	36	37.5	1	●	●	●

Notes:

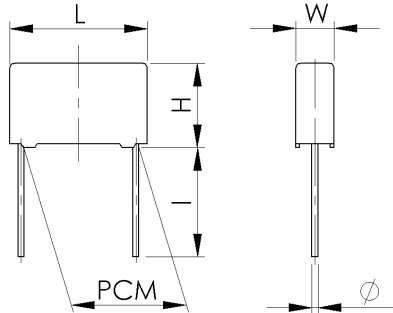
+R ... Discharge resistor, R = 470kΩ to 20MΩ, ±5%

Rated resistance values conform to the E6, E12 or E24 series given in IEC 60063

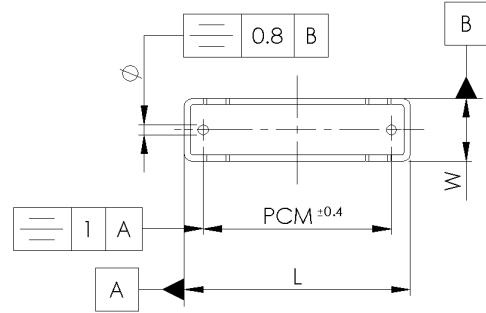
- ... Approvals in use
- ... Approvals pending

material		protection		standard			issue			 <p>Iskra, d.o.o. PE Kondenzatorji</p>			
changes	1	2	3	4	5	6	7	8	9		10		
request.													
date													
sign.													
design	date	sign.	TECHNICAL SPECIFICATION Metallized Polypropylene Film Capacitors (MKP) Type KNB1580 305/310VAC Class X2 <i>RoHS compliant</i>							identification No.			
design	22.1.20	Šuklje								scale		page	
approv.	22.1.20	Dermol										5/18	
stand.													

Terminal dimensions				Maximum case dimensions		
PCM (mm)	Tol. (mm)	Ø (mm)	Tol. (mm)	L _{max} (mm)	H _{max} (mm)	W _{max} (mm)
10.0	±0.4	0.6	±0.05	L +0.2	H +0.1	W +0.2
15.0	±0.4	0.8	±0.05	L +0.3	H +0.1	W +0.2
22.5	±0.4	0.8	±0.05	L +0.3	H +0.1	W +0.3
27.5	±0.4	0.8	±0.05	L +0.3	H +0.1	W +0.3
37.5	±0.4	0.8	±0.05	L +0.3	H +0.1	W +0.3
37.5	±0.4	1.0	±0.05	L +0.3	H +0.1	W +0.3



Note: Standard lead length (l) is 25⁺⁵ mm (L25).
Other lead lengths 3^{+0.5} (L3), 4^{+0.5} (L4), 6⁻¹ (L6),
9⁺¹ (L9), 15^{±2} (L15), 20^{±2} (L20), 30⁺⁵ mm (L30) are
available on request.



E.T.C.: Tolerance of lead wires* located from the center of thickness and from the center of length in mm.


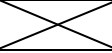
4. Marking

Marking data

- Trade mark of **ISKRA**
- Type designation **KNB1580**
- The symbol **MKP** (metallized polypropylene film cap.)
- Rated capacitance
- Capacitance tolerance if different from ±20%
- Capacitor Class **X2**
- Additional mark: without or rated value of discharge resistor
- Rated voltage indicated by **305VAC** or **310VAC**
- Climatic category in accordance with standard IEC 60068-1 indicated by **40/110/56**
- Passive flammability category indicated by **B** at climatic category according to IEC 60384-14
- Safety approval marks
- Manufacturing code (YEAR, MONTH) according to IEC 60062
- Additional mark: without or **T** (for halogen-free version)

Production date code marking system according to IEC 60062, clause 8.2.2 Two-character code (YEAR, MONTH).

The production date code is indicated with two-characters. The 1st character (letter) indicates the year and the 2nd character (number or letter) indicates the month.

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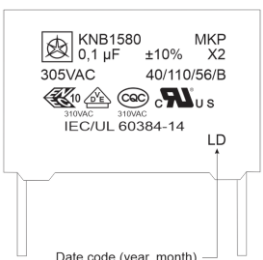
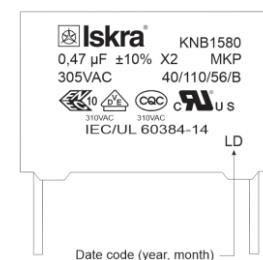
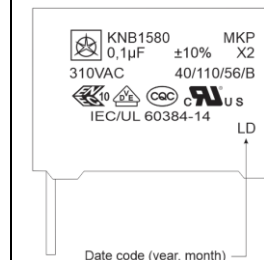
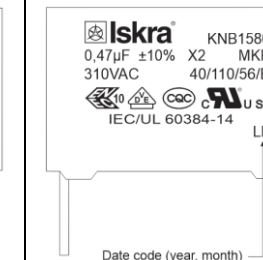
Year	1 st character (letter)
2010	A
2011	B
2012	C
2013	D
2014	E
2015	F
2016	H
2017	J
2018	K
2019	L
2020	M
2021	N
2022	P
2023	R
2024	S
2025	T
2026	U
2027	V
2028	W
2029	X
2030	A


Month	2 nd character (number/letter)
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	O
November	N
December	D

Examples:

- 2017 June = J6
- 2018 May = K5
- 2018 October = KO
- 2019 December = LD

Marking examples of KNB1580

Standard version			
Rated voltage 305VAC		Rated voltage 310VAC	
PCM < 22.5mm	PCM ≥ 22.5mm	PCM < 22.5mm	PCM ≥ 22.5mm
 <p>KNB1580 MKP 0,1 µF ±10% X2 305VAC 40/110/56/B IEC/UL 60384-14 LD Date code (year, month)</p>	 <p>Iskra KNB1580 0,47 µF ±10% X2 MKP 305VAC 40/110/56/B IEC/UL 60384-14 LD Date code (year, month)</p>	 <p>KNB1580 MKP 0,1 µF ±10% X2 310VAC 40/110/56/B IEC/UL 60384-14 LD Date code (year, month)</p>	 <p>Iskra KNB1580 0,47 µF ±10% X2 MKP 310VAC 40/110/56/B IEC/UL 60384-14 LD Date code (year, month)</p>

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stand.													

Halogen-free version			
Rated voltage 305VAC		Rated voltage 310VAC	
PCM < 22.5mm	PCM ≥ 22.5mm	PCM < 22.5mm	PCM ≥ 22.5mm

Capacitor with discharge resistor			
Rated voltage 305VAC		Rated voltage 310VAC	
PCM < 22.5mm	PCM ≥ 22.5mm	PCM < 22.5mm	PCM ≥ 22.5mm

Note: Capacitance tolerance ±20% is not marked.

5. Features

- Self-healing metallized polypropylene film
- Used in interference suppression circuit (across-the-line connection)
- Used in series connection with the supply mains (capacitive dropper)
- High capacitance stability
- For harsh environment (high temperature and humidity)
- Can withstand peak pulse voltage up to 2.5 kV (Class X2)
- Optional with integrated discharge resistor (470 kΩ – 20 MΩ)

material		protection		standard			issue			 Iskra, d.o.o. PE Kondenzatorji	
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6. Rating data (Ambient Temperature 20°C)

6.1 Rated voltage (U_R): 305VAC, 310VAC, 50/60Hz

6.2 Rated DC voltage (U_R d.c.): 630VDC

6.3 Rated capacitance (C_R): See table on pages 3 to 5

6.4 Tolerance of capacitance: $\pm 20\%$ for $C \leq 0.1\mu F$ ($\pm 10\%$ on request)
 $\pm 10\%$ for $C > 0.1\mu F$ ($\pm 5\%$ on request)

6.5 Discharge metal film resistor (R): 470k Ω to 20M Ω , $\pm 5\%$, 0.5W

6.6 Dissipation factor: 10^{-3} max. at 1kHz

6.7 Test voltage

Terminal to terminal

Production test:

2200VDC, 1s for $C \leq 1\mu F$

1900VDC, 1s for $C > 1\mu F$ up to $\leq 2.2\mu F$

1600VDC, 2s for $C > 2.2\mu F$

Qualification approval test:

1333VDC, 60s, according to IEC 60384-14

(Performance: No abnormality)

Both terminal to the body:

2120Vrms 50/60Hz, 60s

(Performance: No abnormality)



6.8 Insulation resistance

Terminal to terminal:

$R_i \geq 15000M\Omega$ at 100VDC, 60s for $C \leq 0.33\mu F$

$R \cdot C \geq 5000s$ at 100VDC, 60s for $C > 0.33\mu F$

Both terminal to the body: $\geq 30000M\Omega$ at 100VDC

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6.9 Pulse rise time: 100V/ μ s at 438VDC according to IEC 60384-14
 Max. pulse rise time at 438VDC tested according to IEC 60384-14
 500V/ μ s for PCM = 10mm
 400V/ μ s for PCM = 15mm and $C \leq 0.022\mu$ F
 250V/ μ s for PCM = 15mm and $C > 0.022\mu$ F
 150V/ μ s for PCM = 22.5mm
 100V/ μ s for PCM = 27.5mm
 100V/ μ s for PCM = 37.5mm

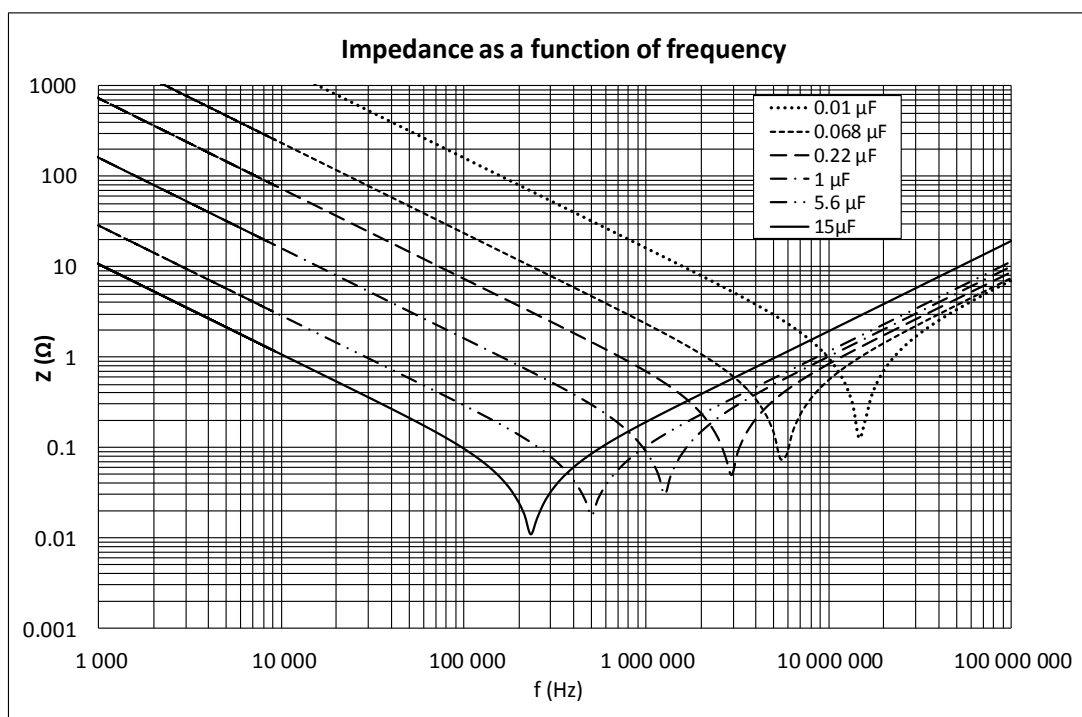
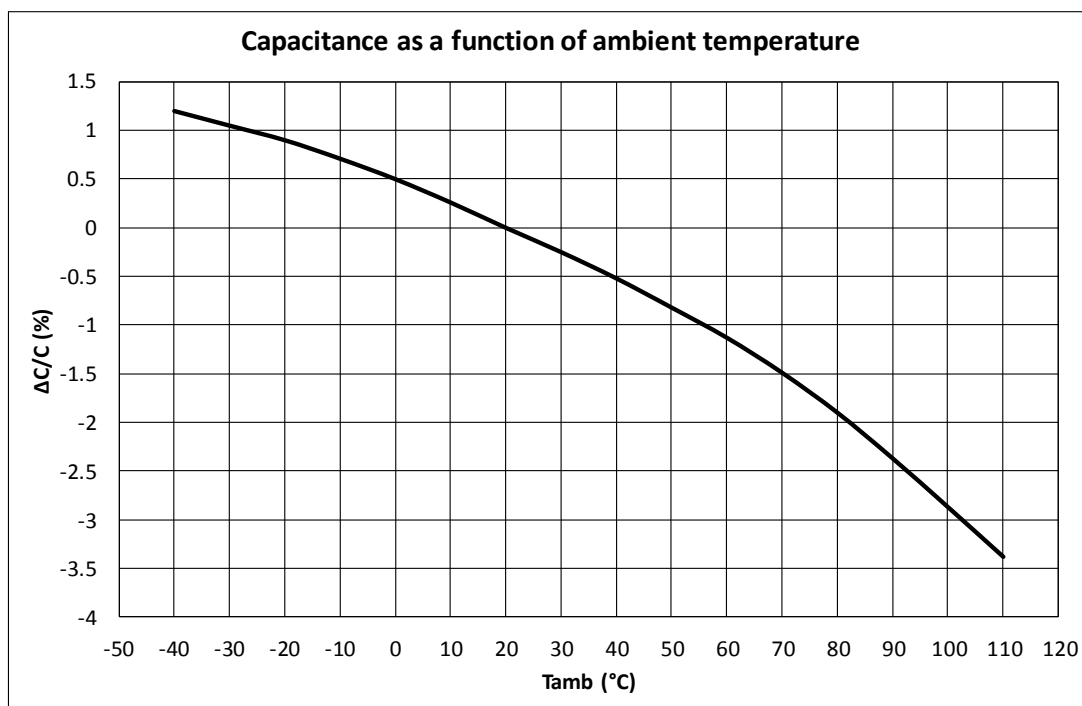
6.10 Operating temperature: -40°C to +110°C

6.11 Climatic category: 40/110/56

6.12 Passive flammability: category B according to IEC 60384-14

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6.13 Characteristics



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7. Efficiency test

Test. No.	Application item	Performance	Test method (IEC 60384-14)
1.	Test voltage Terminal to terminal	No defect	Ref. item 4.2.1 1333VDC, 1 min.
	Terminal to body	No defect	2120Vrms, 1 min.
2.	Capacitance	Shall be within the tolerance	Ref. item 4.2.2 at 1kHz up to U_R max.
3.	Insulation resistance Terminal to terminal	15000M Ω min. for $C \leq 0.33\mu\text{F}$ 5000s min. for $C > 0.33\mu\text{F}$	Ref. item 4.2.5 Measured at 100VDC, 1 min. and 20°C
	Terminal to body	30000M Ω min.	
4.	Dissipation factor	Reference value only. The increase after specified test shall be: 0.008 max. for $C \leq 1\mu\text{F}$ 0.005 max. for $C > 1\mu\text{F}$	Ref. item 4.2.3 Measured at 10kHz for $C \leq 1\mu\text{F}$ and at 1kHz for $C > 1\mu\text{F}$
5.	Robustness of terminations	No visible damage	Ref. item 4.3 Test U_{a1} – Tensile Severity: $F=10\text{N}$, $t=10\text{s}$
6.	Resistance to soldering heat	Appearance: No abnormality Cap. Drift: within $\pm 5\%$ of initial value	Ref. item 4.4 Test Tb, Method A1 Use 1.5 \pm 0.5mm thick glass epoxy board as a holder. Soldering temp. (260 \pm 5)°C, dipping duration (10 \pm 1)s
7.	Solderability	Soldering time: 1.5s max.	Ref. item 4.5 IEC 60068-2-20, Test Ta, Method 3: Solder globule at 235°C
8.	Rapid change of temperature	Appearance: No abnormality	Ref. item 4.6 IEC 60062-2-14, Test Na $T_A = +110^\circ\text{C}$ $T_B = -40^\circ\text{C}$ 5 cycles

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Test No.	Application item	Performance	Test method (IEC 60384-14)
9.	Vibration	Appearance: No abnormality	Method of mounting: see note below Ref. item 4.7 IEC 60068-2-6, Test Fc Amplitude 0.75mm or 98m/s ² Add XYZ 3 directions for 2h per direction Frequency range: 10Hz to 2000Hz
		No open or short circuit	
10.	Bump	Appearance: No abnormality	Method of mounting: see note below Ref. item 4.8 IEC 60068-2-29, Test Eb 4000 bumps at 390m/s ² Impulse duration: 6ms
		No open or short circuit	
11.	Damp heat, steady state	Appearance: No abnormality	Ref. item 4.12 IEC 60068-2-3, Test Ca Temperature 40°C and relative humidity 90-95% for 56 days with no voltage applied
		Cap. Drift: within ±5% of initial value	
		Dissipation factor The increase: - 0.008 max. for C ≤ 1μF measured at 10kHz - 0.005 max. for C > 1μF measured at 1kHz	
		Voltage proof: No permanent breakdown or flash-over	
		Insulation resistance: min. 50% of No.3 value	
12.	Impulse voltage	Appearance: No abnormality No permanent breakdown or flash-over	Ref. item 4.13 Max. 24 impulses with a peak value: 2.5kV up to C ≤ 1μF, 2.5kV/√C for C > 1μF and with wave-shape 1.2/50μs


Note: The capacitor shall be mechanically fixed by the soldered leads and the stand-off pips (ridges) shall be in good contact with the printed-wiring board, the body of capacitors with a mass > 6g shall be clamped to the printed-wiring board.

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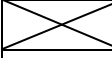
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Test. No.	Application item	Performance	Test method (IEC 60384-14)
13.	Endurance	Appearance: No abnormality	Ref. item 4.14 Temp. 110°C, 387.5VAC (1.25·U _R) shall be applied continuously for 1000h. During the test 1000VAC for 0.1s per hour shall be applied.
		Cap. Drift: within ±10% of initial value	
		Dissipation factor The increase: - 0.008 max. for C ≤ 1μF measured at 10kHz - 0.005 max. for C > 1μF measured at 1kHz	
		Voltage proof: No permanent breakdown or flash-over	
		Insulation resistance: min. 50% of No.3 value	
14.	Charge and discharge	Cap. Drift: within ±10% of initial value	Ref. item 4.15 10000 pulses at 100V/μs with charge voltage $\sqrt{2}$ U _R at a rate of one cycle per s
		Dissipation factor: The increase 0.008 max. of initial value measured at 10kHz for C ≤ 1μF The increase 0.005 max. of initial value measured at 1kHz for C > 1μF	
		Insulation resistance: min. 50% of No.3 value	
15.	Passive flammability	Max. permitted burning time: - 10s category B	Ref. item 4.17 category B Flame exposure time depends on cap. volume Flame: Needle flame test according to IEC 60695-2-2
16.	Active flammability	The cheese-cloth around the capacitor shall not burn with a flame	Ref. item 4.18 20 surge pulses at 2.5kV are applied with the interval of 5s During the test, a potential of rated AC voltage is applied across the cheese-cloth wrapped capacitor under test
17.	Component solvent resistance	No visible damage	Ref. item 4.19 Solvent: isopropyl alcohol +R 113 Solvent temperature: 23±5°C Method 2 (IEC 60068-2-45) without recovery

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Test. No.	Application item	Performance	Test method (IEC 60384-14)
18.	Solvent resistance of marking	Marking shall remain legible	Ref. item 4.20 Solvent: isopropyl alcohol +R 113 Solvent temperature: 23±5°C Method 1 (IEC 60068-2-45) without recovery Rubbing material: cotton wool
19.	Rapid damp test	Cap. drift: within ±5% of the initial value	Internal requirements: Temp. 98-102°C and relative humidity 96-100% for 96 hours with applied voltage 385VAC
		Dissipation factor The increase: - 0.01 max. of initial value measured at 1kHz	
		Insulation resistance: min. 50% of No.3 value	
20.	Reliability test	Cap. drift: within ±5% of initial value	Internal requirements: Temp. 58-62°C for 2000 hours with applied voltage 275VAC
		Dissipation factor The increase: - 0.01 max. of initial value measured at 1kHz	
		Insulation resistance: min. 50% of No.3 value	
21.	Temperature, Humidity and Bias (THB), 500h	Cap. drift: within ±10% of the initial value	Annex I Test condition B, Grade II: Temp. 85°C ± 2°C and relative humidity 85% ± 2% for 500 hours with applied voltage 310VAC
		Dissipation factor The increase: - 0.024 max. for C ≤ 1µF measured at 10kHz - 0.015 max. for C > 1µF measured at 1kHz	
		Insulation resistance: min. 50% of No.3 value	
22.	Temperature, Humidity and Bias (THB), 1000h	Cap. drift: within ±10% of initial value	Internal requirements: Temp. 85°C ± 2°C and relative humidity 85% ± 2% for 1000 hours with applied voltage 240VAC
		Insulation resistance: min. 50% of No.3 value	

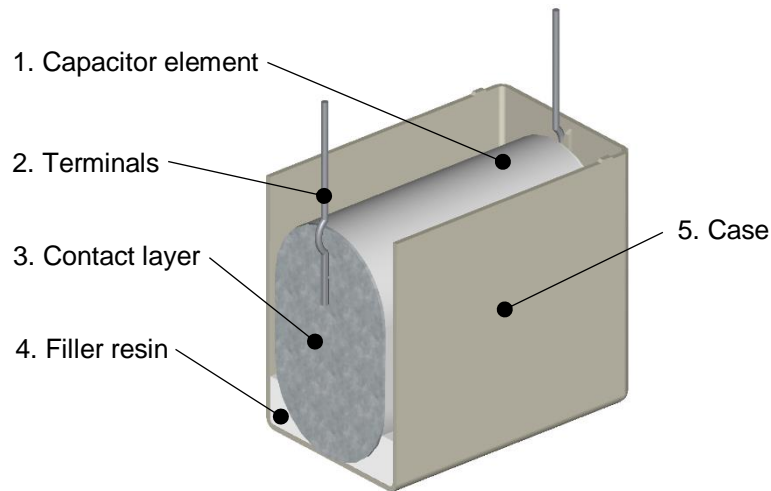
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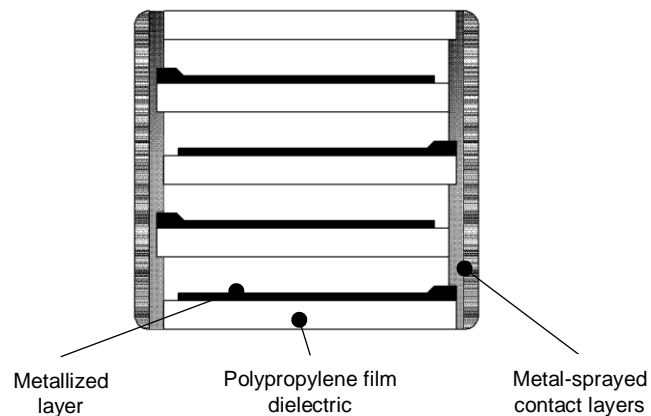
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8. Structure drawing



No.	Article	Materials	Flame resistance
1.	Capacitor element	Metallized PP film (Al/Zn)	
2.	Terminals	Solid tinned copper wire	
3.	Contact layer	Sprayed metal (Zn)	
4.	Filler resin	Flame-retardant epoxy	UL 94 V-0 approved
5.	Case	Polypropylene – PP or Polybutylene terephthalate – PBT (Halogen-free version)	UL 94 V-0 approved
6.	Discharge resistor (optional)	Metal film leaded resistor	

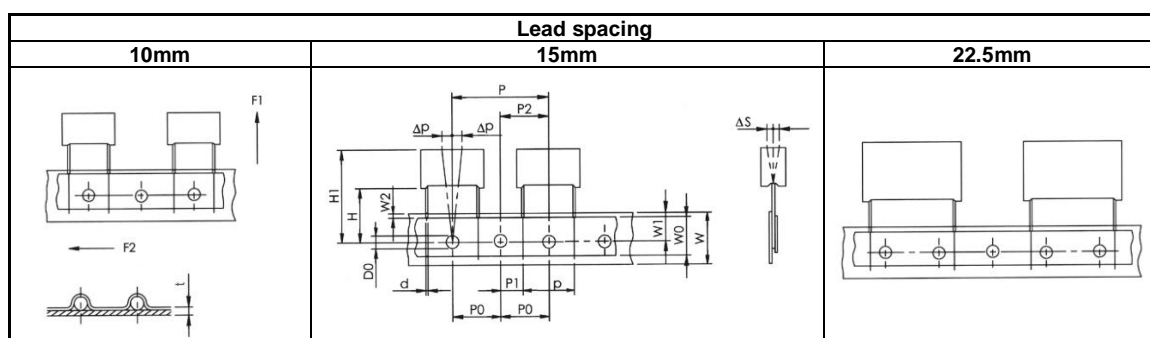
9. Winding construction




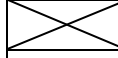
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10. Taping specification according to IEC 60386-2

Description	Symbol	Dimensions (mm)			Tolerances (mm)
Lead spacing	p	10	15	22.5	+0.6/-0.1
Carrier tape width	W	18	18	18	+1/-0.5
Hold-down tape width	W_o	12 or 6	12 or 6	12 or 6	±0.5
Hole position	W₁	9	9	9	±0.5
Hold-down tape position	W₂	3	3	3	max
Feed hole diameter	D_o	4	4	4	±0.2
Pitch of component	P	25.4	25.4	38.1	±1
Feed hole pitch	P_o	12.7	12.7	12.7	±0.2
Feed hole centre to lead	P₁	7.7	5.2	7.8	±0.7
Free hole centre to component centre	P₂	12.7	12.7	19.05	±1.3
Height from feed hole center to the component body	H	18.5	18.5	18.5	±0.5
Component alignment	Δp	0	0	0	±1.3
	Δs	0	0	0	±2
Lead wire diameter	d	0.6	0.8	0.8	±0.05
Total tape tickness	t	0.7	0.7	0.7	±0.2
Component height	H₁	31	34	39	max
Extraction force of the tape	F₁	5 N	5 N	5 N	min
Break force of the tape	F₂	15 N	15 N	15 N	min



Lead spacing	Capacitor width	Ammo-pack (TA)		Reel-pack (TR)	
		pcs/box	Packing dimensions	pcs/reel	Packing dimensions
10	4; 4.3	900		900	
	5	768		700	
	6	648		550	
15	5	768		600	
	5.5	696		600	
	6	648		500	
	7	552		450	
	7.5	504		400	
	8.5	444		400	
22.5	9	420		400	
	6	424		370	
	6.5	392		350	
	7	368		300	
	8.5	304		250	
	10	256		200	
	10.5	240	200		

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11. Ordering information

KNB1580	U47	10%	+1M5	310VAC	L25	R22.5	D26.5x17x8.5	HF	
									ADDITIONAL MARK: HF VERSION
									DIMENSIONS LxHxW
									PITCH
									LEAD LENGTH
									RATED VOLTAGE
									ADDITIONAL MARK: DISCHARGE RESISTOR
									CAPACITANCE TOLERANCE
									RATED CAPACITANCE
									TYPE DESIGNATION

When you order, following data should be given:

- Type designation (KNB1580)
- Rated capacitance (U47=0.47μF, U01=0.01μF, 8U2=8.2μF, etc.)
- Capacitance tolerance (10%, 20%)
- Additional mark: without or rated value of discharge resistor (+1M5= 1.5MΩ)
- Rated voltage (305VAC or 310VAC)
- Lead length (L25=25^{+5/-0}mm, TR=Rele pack, TA=Ammo pack, etc.)
- Pitch value (R22.5=22.5mm, R27.5=27.5mm, R37.5= 37.5mm, etc.)
- Dimensions LxHxW (D26.5x17x8.5, etc.)
- Additional mark: without or HF for Halogen-free version

Examples:

1) Rated voltage 305VAC

Standard version: KNB1580 U47 10% 305VAC L25 R22.5 D26.5x17x8.5

Halogen-free version: KNB1580 U47 10% 305VAC L25 R22.5 D26.5x17x8.5 HF

2) Rated voltage 310VAC

Standard version: KNB1580 U47 10% 310VAC L25 R22.5 D26.5x17x8.5

Halogen-free version: KNB1580 U47 10% 310VAC L25 R22.5 D26.5x17x8.5 HF



3) Rated voltage 310VAC with discharge resistor 1.5MΩ

Standard version: KNB1580 U47 10%+1M5 310VAC L25 R22.5 D26.5x18.5x10

Halogen-free version: KNB1580 U47 10%+1M5 310VAC L25 R22.5 D26.5x18.5x10 HF

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