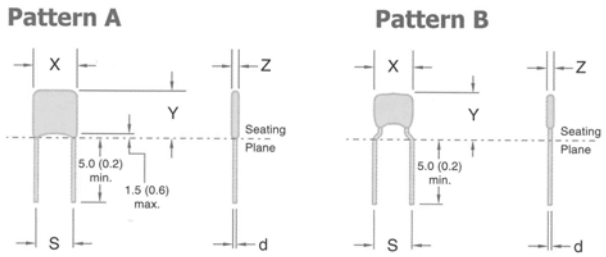
Radial

Dipped Radial Leaded Capacitors

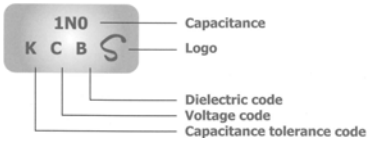
SYFER



Note: Pattern A may be substituted with Pattern B at Syfer's discretion.

Marking Information
All encapsulated capacitors are marked with: Capacitance value, tolerance, rated d.c. voltage, dielectric, and where size permits the Syfer Technology 'S' logo.

Example: 1000pF ± 10% 50V 2X1 Dielectric



Electrical Details

Capacitance Range		4.7pF to 22µF
Temperature Coefficient of Capacitance (TCC)	C0G/NP0	0 ± 30ppm/°C
	X7R	±15% from -55 to +125°C
Dissipation Factor	C0G/NP0	Cr > 50pF ≤0.0015
		Cr ≤ 50pF = 0.0015(15÷Cr+0.7)
	X7R	≤ 0.025
Insulation Resistance (IR)		100GΩ or 1000secs (whichever is the less)
Dielectric Withstand Voltage (DWV)		Voltage applied for 5 ±1 seconds, 50mA charging current maximum
Ageing Rate	C0G/NP0	Zero
	X7R	<2% per time decade

Syfer Technology produces a wide range of dipped radial leaded capacitors. These are available in rated voltages of 50V up to 12kV. Our larger case sizes and high voltage versions are particularly in demand, especially for mil/aero and medical power supply applications. Please contact our Sales Office to discuss any special requirements.

- High working voltage – up to 12kVdc
- Large case sizes
- RoHS compliant versions
- Tin-lead plated wire option to reduce tin whiskers (quote suffix A97 for 8111 to 8141 & A31 for 8151, 8161 & 8171)

		Width	Height	Thickness	Lead Space	Lead Diameter
	Pattern	(X) max. mm(inches)	(Y) max. mm(inches)	(Z) max. mm(inches)	(S) max. mm(inches)	(d) max. mm(inches)
8111M	A	3.81 (0.15)	5.31 (0.21)	2.54 (0.10)	2.54 ±0.4 (0.1 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8111N	N	3.81 (0.15)	5.31 (0.21)	2.54 (0.10)	5.08 ±0.4 (0.2 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8121M	A	5.08 (0.20)	6.58 (0.26)	3.18 (0.125)	2.54 ±0.4 (0.1 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8121N	B	5.08 (0.20)	6.58 (0.26)	3.18 (0.125)	5.08 ±0.4 (0.2 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8121T	B	10.16 (0.40)	5.80 (0.23)	4.50 (0.18)	7.62 ±0.4 (0.3 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8131M	A	7.62 (0.30)	9.12 (0.36)	3.81/6.30 (0.15/0.25)	5.08 ±0.4 (0.2 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8131T	B	10.16 (0.40)	9.12 (0.36)	4.50 (0.18)	7.62 ±0.4 (0.3 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8141M	A	10.16 (0.40)	11.66 (0.46)	3.81 (0.15)	5.08 ±0.4 (0.2 ±0.016)	0.5 ±0.05 (0.02 ±0.002)
8151M	A	12.70 (0.50)	14.20 (0.56)	5.08/6.30 (0.20/0.25)	10.1 ±0.4 (0.4 ±0.016)	0.6 ±0.05 (0.025 ±0.002)
8161M	A	18.50 (0.73)	16.50 (0.65)	6.00/7.00 (0.24/0.28)	14.5 ±0.5 (0.57 ±0.020)	0.6 ±0.05 (0.025 ±0.002)
8165M	A	19.00 (0.75)	19.00 (0.75)	4.25 (0.17)	17.5 ±0.5 (0.67 ±0.020)	0.6 ±0.05 (0.025 ±0.002)
8171M	A	25.00 (0.98)	20.00 (0.79)	6.00/7.00 (0.24/0.28)	21.0 ±0.6 (0.83 ±0.024)	0.6 ±0.05 (0.025 ±0.002)

Ordering Information – Radial Leaded Capacitors

8111M	100	0102	J	C	□□□	□□□
Type No / Size ref	**Voltage d.c. (marking code)**	**Capacitance in Pico farads (pF)**	**Capacitance Tolerance**	**Dielectric Codes**	**Suffix Code**	**Suffix Code**
8111M 8111N 8121M 8121N 8121T 8131M 8131T 8141M 8151M 8161M 8165M 8171M	050 = 50V 063 = 63V 100 = 100V 200 = 200V 250 = 250V 500 = 500V 630 = 630V 1K0 = 1kV 1K2 =1.2kV 1K5 =1.5kV 2K0 = 2kV 2K5 =2.5kV 3K0 =3kV 4K0 =4kV 5K0 =5kV 6K0 =6kV 8K0 =8kV 10K =10kV 12K =12kV	<10pF Insert a P for the decimal point as the second character. e.g., 8P20 = 8.2pF ≥10pF First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is the number of zeros following. e.g., 0101 = 100 pF	<10pF D: ± 0.5pF F: ± 1.0pF ≥10pF J: ± 5% K: ± 10% M: ± 20% >27pF G: ± 2% (C0G/NP0 only)	C = C0G/NP0 (1B/CG; CG/BP) X = X7R (2R1) To Special Order B = 2X1 (BX) R = 2C1 (BZ)	Used for specific customer requirements	C42 denotes RoHS compliant. A31 or A97 denote non-RoHS tin/lead wires. Suffix A97 for 8111 to 8141 & A31 for 8151, 8161, 8171

Notes: The voltage code may be replaced with the complete voltage (e.g., 1500V = 1K5V) at Syfer's discretion. Marking may be over both sides of the component as necessary.

Radial Leaded Capacitors – Minimum / Maximum Capacitance Values

		8111M	8111N	8121M	8121N	8121T	8131M	8131M T = 6.3mm	8131T	8141M	8151M	8151M T = 6.3mm	8161M	8161M T = 7.0mm	8171M	8171M T = 7.0mm
Min. cap values	C0G/NP0	4.7pF	4.7pF	4.7pF	4.7pF	4.7pF	4.7pF	-	10pF	4.7pF	10pF	-	27pF	-	47pF	-
	X7R	100pF	100pF	100pF	100pF	100pF	100pF	-	150pF	100pF	470pF	-	1.0nF	-	1.8nF	-
50/63V	C0G/NP0	5.6nF	5.6nF	33nF	33nF	33nF	220nF	-	100nF	220nF	330nF	-	680nF	-	1.0µF	-
	X7R	220nF	220nF	1.0µF	1.0µF	1.0µF	3.3µF	-	2.2µF	4.7µF	10µF	-	15µF	-	22µF	-
100V	C0G/NP0	2.2nF	2.2nF	18nF	18nF	18nF	82nF	-	47nF	82nF	270nF	-	470nF	-	680nF	-
	X7R	100nF	100nF	680nF	680nF	680nF	2.7µF	-	1.5µF	2.7µF	5.6µF	-	10µF	-	15µF	-
200/250V	C0G/NP0	1.0nF	1.0nF	8.2nF	8.2nF	8.2nF	47nF	68nF	22nF	47nF	120nF	180nF	270nF	330nF	390nF	560nF
	X7R	56nF	56nF	330nF	330nF	330nF	1.5µF	-	680nF	1.5µF	3.3µF	-	5.6µF	-	10µF	-
500V	C0G/NP0	680pF	680pF	6.8nF	6.8nF	6.8nF	33nF	47nF	15nF	33nF	82nF	120nF	180nF	270nF	270nF	470nF
	X7R	15nF	15nF	150nF	150nF	150nF	820nF	-	330nF	820nF	1.0µF	-	1.8µF	-	3.3µF	-
630V	C0G/NP0	560pF	560pF	3.9nF	3.9nF	3.9nF	22nF	39nF	10nF	22nF	68nF	100nF	120nF	180nF	220nF	390nF
	X7R	12nF	12nF	100nF	100nF	100nF	390nF	-	180nF	470nF	680nF	-	1.2µF	-	2.2µF	-
1kV	C0G/NP0	180pF	180pF	2.2nF	2.2nF	2.2nF	18nF	27nF	6.8nF	18nF	47nF	82nF	82nF	150nF	150nF	270nF
	X7R	10nF	10nF	47nF	47nF	47nF	150nF	-	100nF	150nF	180nF	-	390nF	-	1.0µF	-
1.2kV	C0G/NP0	120pF	120pF	1.5nF	1.5nF	1.5nF	12nF	22nF	4.7nF	12nF	33nF	56nF	68nF	100nF	100nF	180nF
	X7R	-	-	10nF	10nF	10nF	100nF	-	33nF	100nF	150nF	-	220nF	-	470nF	-
1.5kV	C0G/NP0	82pF	82pF	820pF	820pF	820pF	6.8nF	12nF	2.7nF	6.8nF	22nF	39nF	39nF	68nF	68nF	120nF
	X7R	-	-	6.8nF	6.8nF	6.8nF	68nF	-	22nF	68nF	100nF	-	150nF	-	330nF	-
2kV	C0G/NP0	39pF	39pF	390pF	390pF	390pF	4.7nF	6.8nF	1.5nF	4.7nF	10nF	18nF	22nF	39nF	39nF	68nF
	X7R	-	-	4.7nF	4.7nF	4.7nF	33nF	-	10nF	47nF	47nF	-	82nF	-	150nF	-
2.5kV	C0G/NP0	-	-	220pF	220pF	220pF	2.2nF	3.9nF	820pF	2.2nF	6.8nF	12nF	12nF	22nF	22nF	39nF
	X7R	-	-	-	-	-	12nF	-	3.3nF	12nF	33nF	-	68nF	-	100nF	-
3kV	C0G/NP0	-	-	150pF	150pF	150pF	1.8nF	2.7nF	560pF	1.8nF	4.7nF	8.2nF	10nF	18nF	15nF	27nF
	X7R	-	-	-	-	-	8.2nF	-	2.7nF	10nF	22nF	-	47nF	-	82nF	-
4kV	C0G/NP0	-	-	-	-	-	820pF	1.5nF	270pF	820pF	1.8nF	3.3nF	4.7nF	6.8nF	8.2nF	15nF
	X7R	-	-	-	-	-	5.6nF	-	2.2nF	5.6nF	6.8nF	-	15nF	-	33nF	-
5kV	C0G/NP0	-	-	-	-	-	560pF	1.0nF	180pF	560pF	1.5nF	2.2nF	2.7nF	4.7nF	5.6nF	10nF
	X7R	-	-	-	-	-	4.7nF	-	1.2nF	4.7nF	5.6nF	-	10nF	-	22nF	-
6kV	C0G/NP0	-	-	-	-	-	390pF	680pF	120pF	390pF	1.0nF	1.5nF	1.8nF	3.3nF	3.9nF	6.8nF
	X7R	-	-	-	-	-	2.7nF	-	1.0nF	2.7nF	4.7nF	-	8.2nF	-	15nF	-
8kV	C0G/NP0	-	-	-	-	-	-	-	-	-	150pF	-	330pF	-	680pF	-
	X7R	-	-	-	-	-	-	-	-	-	1.5nF	-	4.7nF	-	6.8nF	-
10kV	C0G/NP0	-	-	-	-	-	-	-	-	-	100pF	-	180pF	-	470pF	-
	X7R	-	-	-	-	-	-	-	-	-	1.0nF	-	2.2nF	-	4.7nF	-
12kV	C0G/NP0	-	-	-	-	-	-	-	-	-	68pF	-	120pF	-	220pF	-
	X7R	-	-	-	-	-	-	-	-	-	820pF	-	1.2nF	-	2.2nF	-
		8111M	8111N	8121M	8121N	8121T	8131M	8131M T = 6.3mm	8131T	8141M	8151M	8151M T = 6.3mm	8161M	8161M T = 7.0mm	8171M	8171M T = 7.0mm

Wave Soldering

Wave soldering is generally acceptable, but the thermal stresses caused by the wave have been shown to lead to potential problems with larger or thicker chips.

Maximum permissible wave temperature is 260˚C for Radial Leaded capacitors.

The total immersion time in solder should be kept to a minimum. It is strongly recommended that Sn/Ni plated terminations are specified for wave soldering applications.

REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) Statement

The main purpose of REACH is to improve the protection of human health and the environment from the risks arising from the use of chemicals.

Syfer Technology Ltd maintains both ISO 14001, Environmental Management System and OHSAS 18001 Health & Safety Management System approvals that require and ensure compliance with corresponding legislation such as REACH.

For further information, please contact the sales office at SyferSales@knowles.com

Hand Soldering Radial Leaded Capacitors

Radial capacitors can be hand soldered into boards using soldering irons, provided care is taken not to touch the body of the capacitor with the iron tip. Soldering should be carried out from the opposite side of the board to the radial to minimise the risk of damage to the capacitor body. Where possible, a heat sink should be used between the solder joint and the body, especially if longer dwell times are required.

RoHS Compliance

Syfer routinely monitors world wide material restrictions (e.g., EU/China and Korea RoHS mandates) and is actively involved in shaping future legislation.

All standard Radial Leaded capacitors are compliant with the EU RoHS directive. Compliance with EU RoHS directive automatically signifies compliance with some other legislation (e.g., Korea RoHS). Please refer to the Sales Office for details of compliance with other materials legislation.

Most radial components are available with non-RoHS compliant tin/lead (SnPb) solderable lead finish for exempt applications and where pure tin is not acceptable.

Check the website, www.knowlescapacitors.com/syfer for latest RoHS update.

Packing Information

Cropped Leads

Cropped leads between 4.0mm (0.157”) and 30.0mm (1.18”) are available to special order. Some of the preferred codes are listed below, together with the appropriate suffix code.

Dimensions as for standard product except as specified.

Suffix Code – AE3 All radial ranges	**Suffix Code – AE4** All radial ranges	**Suffix Code – AD7** All radial ranges	**Suffix Code – AD5** All radial ranges
Lead length (L) 6 ±1mm (0.236 ±0.04”) from seating plane	Lead length (L) 4 ±1mm (0.162 ±0.04”) from seating plane	Lead length (L) 5 ±1mm (0.2 ±0.04”) from seating plane	Lead length (L) 10 ±1mm (0.4 ±0.04”) from seating plane

Snap in Leads

Various forms of snap in leads (preformed) are available to special order, some of the preferred suffix codes are listed below. Dimensions as for standard product except as specified.

Suffix Code – AD1

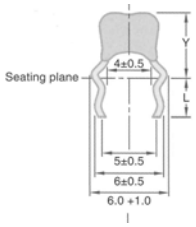
For PCB holes 0.9mm diameter

Types 8121N and 8131M

Dimensions

Y = 8121N 8mm (0.315”) Max
8131M 10mm (0.394”) Max

L = Min: 2.75mm (0,108”)
Max: 3.50mm (0.138”)



Suffix Code – AD2

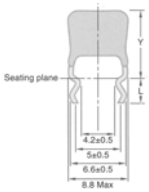
For PCB holes 1.2mm diameter

Types 8131M

Dimensions

Y = 10mm (0.394”) Max

L = Min: 2.75mm (0,108”)
Max: 3.50mm (0.138”)



Suffix Code – AD3

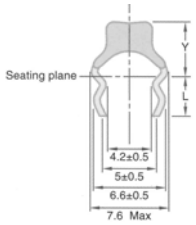
For PCB holes 1.2mm diameter

Types 8121N

Dimensions

Y = 8mm (0.315”) Max

L = Min: 2.75mm (0,108”)
Max: 3.50mm (0.138”)

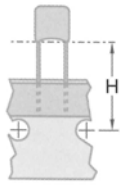


Bandoliered Suffix Codes

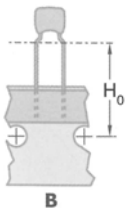
Dipped radial leaded with 2.54 and 5.08mm lead spacing can be supplied bandoliered on reels or in ammo boxes to special order. Some of the preferred suffix codes for bandoliered products are given below

For bandoliered products the minimum order quantity, pieces, is specified in the tables below, larger orders must be in multiples of this quantity.

Dipped – Straight and Formed Leads



A

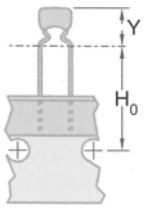


B

					Suffix Code		
					Reel	Ammo Pack	
Product Code	Lead Style	Diagram	H	H_0	2500pcs	1000pcs	2000pcs
8111M	Straight 2.54 crs	A	19 ±1	-	C02	C02	C11
8111M	Straight 2.54 crs	A	16 ±0.5	-	C30	C31	C32
8111N	Formed 5.08 crs	B	-	16 ±0.5	C01	C02	C11
8121M	Straight 2.54 crs	A	19 ±1	-	C01	C02	C11
8121M	Straight 2.54 crs	A	16 ±0.5	-	C30	C31	C32
8121N	Formed 5.08 crs	B	-	16 ±0.5	C01	C02	C11
8131M	Straight 5.08 crs	A	19 ±1	-	C01	C02	C11
8131M	Straight 5.08 crs	A	16 ±0.5	-	C30	C31	C32

8121T and 8131T available in bulk packaging only.

Dipped – Stand-off Lead Form



This style has been developed to provide a meniscus-free seating plane with a stress relieving form for auto-insertion

Product Code	Lead Style	Y max	H_0	2500pcs	1000pcs	2000pcs
8111N	Formed 5.08 crs	7.5	16 ±0.5	C12	C23	C22
8111N	Formed 5.08 crs	7.5	19 ±1	C13	C25	C24
8121N	Formed 5.08 crs	8.5	16 ±0.5	C12	C23	C22
8121N	Formed 5.08 crs	8.5	19 ±1	C13	C25	C24

Packing Information

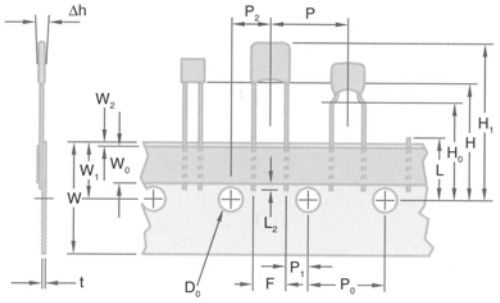
A maximum of 3 consecutive components may be missing from the bandolier, followed by at least 6 filled positions. Components missing from the bandolier are included in the total quantity, whereby the number of missing components may not exceed 0.25% of this total packing module. At the beginning and end of the reel the bandolier will exhibit at least 10 blank positions.

Minimum pull strength of product from tape =5N.

Each reel/carton is provided with a label showing the:

Manufacturer, product style, batch identification, quantity and date code.

Labelling with bar codes (code 39) is available on request.

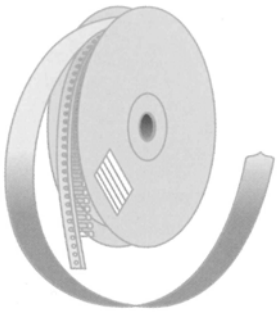


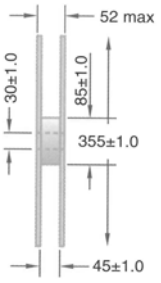
In accordance with IEC 60286 part 2.

Dimensions mm (inches)

Description	Symbol	2.5mm Lead Space	5mm Lead Space	Tolerance
Lead wire diameter	D	0.5 (0.02) 0.6 (0.025)	0.5 (0.02) 0.6 (0.025)	±0.05 (0.002)
Component pitch	P	12.7 (0.5)	12.7 (0.5)	1.00 (0.04)
Feed hole pitch	P_0	12.7 (0.5)	12.7 (0.5)	±0.30 (0.01)
Feed hole centre to lead	P_1	5.08 (0.2)	3.81 (0.15)	±0.70 (0.03)
Feed hole centre to component	P_2	6.35 (0.25)	6.35 (0.25)	±0.70 (0.03)
Lead spacing	F	2.54 (0.10)	5.08 (0.20)	+0.6 (0.02) -0.1 (0.004)
Component alignment	Δh	0	0	±2.00 (0.08)
Tape width	W	18.0 (0.7)	18.0 (0.7)	+1.0 (0.04) -0.50 (0.02)
Hold down tape width	W_0	6.0 (0.23)	6.0 (0.23)	±0.30 (0.01)
Hole position	W_1	9.0 (0.35)	9.0 (0.35)	±0.50 (0.02)
Hold down tape position	W_2	0.50 (0.02)	0.50 (0.02)	Max
Height to seating plane from tape centre (straight leads) (2)	H	16 (0.63) to 20 (0.79)	16 (0.63) to 20 (0.79)	As required
Height to seating plane from tape centre (formed leads) (2)	H_0	16 (0.63) to 20 (0.79)	16 (0.63) to 20 (0.79)	As required
Height to top of component from tape centre	H_1	32.2 (1.26)	32.2 (1.26)	Max
Feed hole diameter	D_0	4.0 (0.16)	4.0 (0.16)	±0.20 (0.008)
Carrier tape plus adhesive tape thickness	T	0.7 (0.03)	0.7 (0.03)	±0.20 (0.008)
Carrier tape thickness	-	0.5 (0.02)	0.5 (0.02)	±0.10 (0.004)
Cut out component snipped lead length from tape centre	L	11.0 (0.43)	11.0 (0.43)	Max
Lead wire protrusion from hold down	L_2	2.0 (0.08)	2.0 (0.08)	Max

Bandoliered Reels

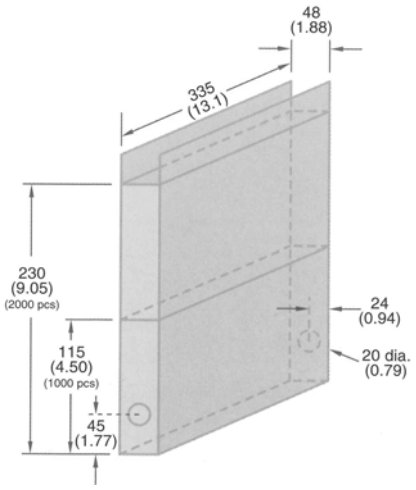




The adhesive tape faces outwards. The dispensing direction is as shown. For the protection of the components a paper inlay is inserted between the windings of the bandolier. At the end of the bandolier this paper inlay continues for at least a further two rotations.

Bandoliered Ammo Packing

2 Carton Sizes



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