

NON-INDUCTIVE RESIN PAINT WIRE WOUND RESISTORS

1. Applicable Scope:

This standard specification is for use in consumer electronics, computers, telecommunications, control instruments...etc.

2. Part Number:

It is composed by Type, Rated Wattage, Nominal Resistance, Tolerance and Package/Terminal Form. e.g.

<u>NKNP</u>	<u>2W</u>	<u>10R</u>	<u>J</u>	<u>T/B</u>
Type	Rated Wattage	Nominal Resistance	Tolerance	Package/Terminal Form

2.1 Type :

Non Inductive Resin Paint Wire Wound Resistors are called "NKNP".

2.2 Rated Wattage:

Shown by "W", such as 1/2W, 1W, 2W, 3W, 3WL, 5W, 6W, 7W, 8W, 10W.

2.3 Nominal Resistance:

Ω is its unit, which be in accordance with E24(Series).

Letter "10R" indicates resistance value 10Ω .

2.4 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.

G = $\pm 2\%$; J = $\pm 5\%$; K = $\pm 10\%$.

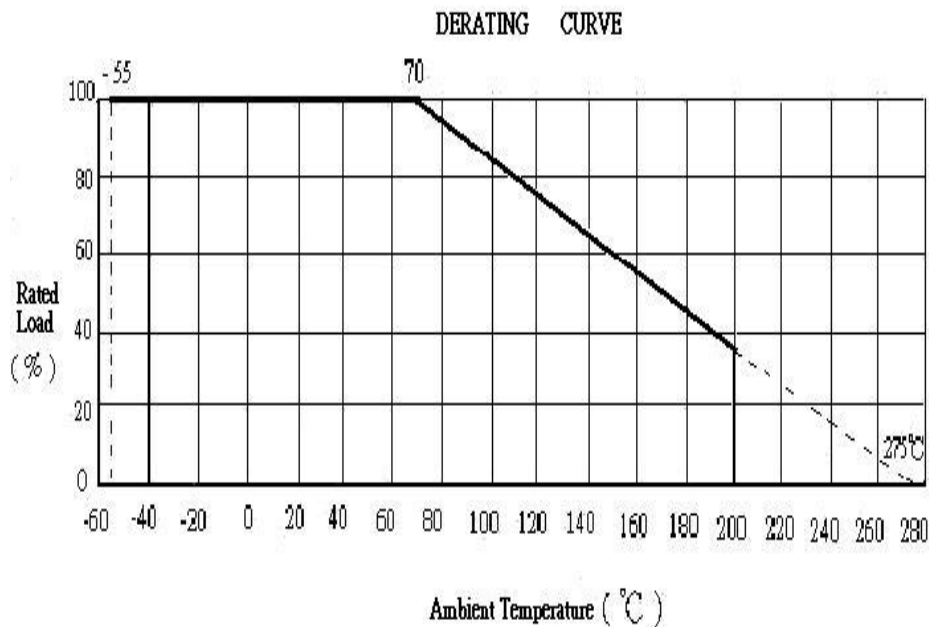
2.5 Package/Terminal Form:

T/R = tape & reel ; T/B = tape in box; Nil = Bulk; MG form; F1~F4 forms.

Remark : NKNP Series Resistors are RoHS & Halogen Free Compliant.

3. Rated Power:

Rated power is the value of Max load power specified at the ambient temperature of 70°C , and shall meet the functions of electrical and mechanical performance. When the ambient temperature surpasses above mentioned temperature, the value declines as per following DERATING CURVE.



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3.1 Rated Voltage:

It is calculated through the following formula:

$$E = \sqrt{PXR}$$

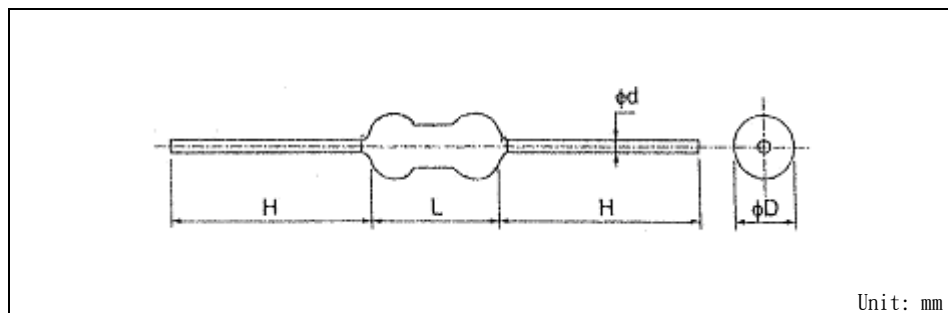
where E: rated voltage (V)

P: rated power (W)

R: total nominal resistance (Ω)

4. Dimension and structure:

4.1 Dimension:



TYPE	$D \pm 1$	$L \pm 1$	$H \pm 3$	$d \pm 0.1$	Resistance Range	Dielectric Withstanding Voltage
NKNP						
1/2W	3	9	28	0.65	0.1 Ω ~ 3 Ω	300V
1W	4	9	28	0.65	0.1 Ω ~ 3 Ω	350V
2W	5	11	28	0.8	0.1 Ω ~ 10 Ω	350V
3W	5.5	13	38	0.8	0.1 Ω ~ 10 Ω	350V
3WL	5.5	15	38	0.8	0.1 Ω ~ 10 Ω	350V
5W	6.5	19	38	0.8	0.1 Ω ~ 20 Ω	350V
6W	8.5	24	38	0.8	0.1 Ω ~ 20 Ω	500V
7W	8.5	32	33	0.8	0.1 Ω ~ 20 Ω	500V
8W	8.5	41	38	0.8	0.1 Ω ~ 20 Ω	750V
10W	8.5	53	38	0.8	0.1 Ω ~ 20 Ω	800V

©Notes: Too low or too high ohmic values can be supplied only case by case.

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4.2 STRUCTURE:

4.2.1 Ceramic Rod:

It is made of alumina ceramic of the kind.

4.2.2 Terminal:

Terminal is to be firmly connected with resistors element, both electrically and mechanically, and allow easy soldering.

4.2.3 Coating:

Coating is done by light green flameproof paint (resistant to 800°C) or Silicon Resin which is solid enough to be free from looseness, crack and easy breakage. It is also resistant to cleaning and industrial solvents, and the paint shall be limited within 2mm of lead wires from resistor body.

4.2.4 Marking:

4.2.4.1 1~6W: Marking is made on resistors surface by five colors coding.

1st, 2nd, 3rd: nominal resistance.

4th: tolerance.

5th: white for Non-Inductive resistors.

4.2.4.2 7~10W: Marking is made on the surface with Rated Wattage, Nominal Resistance, Tolerance, and "NON-IND".

5. Operating Temperature Range: -55°C ~ 200°C

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body, a static load of 2.5kgs. (under 1W:1kg.) is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

6.2 Twist withstand:

To bend the lead wire at the point of about 6mm from resistor body to 90°, then catch the wire at 1.2 ±0.4mm apart from the bent point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of 10 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn 2 times without causing any break and looseness.

7. Electrical Performance:

7.1 Resistance Temperature Coefficient:

It shall be within ±300ppm/°C.

$$T.C \text{ (ppm/°C)} = \left[\frac{R2 - R1}{R1} \right] \times \left[\frac{1}{T2 - T1} \right] \times 10^6$$

where

R1: resistance value at reference temperature

R2: resistance value at test temp.

T1: reference temp. (usu. 25°C)

T2: test temp. (about 75°C)

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7.2 Temperature Cycle:

Following temp. cycles are to be made 5 times and then put at room temp. for one hour, the resistance value change rate between pre-and-post test shall be within $\pm 1\%$.

Steps	Temperature(°C)	Time (minutes)
1 st step	-55 ± 3	30
2 nd step	Room temp.	3
3 rd step	200 ± 3	30
4 th step	Room temp.	3

7.3 Short Time Over Load:

When the resistors are applied 2.5 times as much as rated voltage for 5 seconds continuously, it shows no evidence of arc, flame...etc. Removing the voltage and place the resistors to the normal condition for 30 minutes, the resistance value change rate between pre-and-post test shall be within $\pm 2\%$.

7.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC 100V or 500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over $1000M\Omega$.

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying suitable voltage listed on DIMENSION for one minute and should find no physical damage to the resistors, such as arc, char...etc.

7.6 Load Life:

The resistors arrayed are sent into the 70°C oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000_{-0}^{+48} hours in total. Then, after removing the voltage, take the resistors out of the oven and left under normal temp. for one hour cooling. The resistance value change rate between pre-and-post test shall be within $\pm 3\%$.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of $40 \pm 2^{\circ}\text{C}$ and the humidity of 90~95%, then 1/10 DC rated power is applied for 1.5 hours and cut off for 0.5 hour. The similar cycle will be repeated for 500_{-0}^{+24} hours in total (including cut-off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm 3\%$. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

7.8 Solder-ability:

The leads with flux are dipped in a melted solder of $235 \pm 5^{\circ}\text{C}$ for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

7.9 Resistance to Soldering Heat:

Two leads are together dipped in a melted solder of $270 \pm 5^{\circ}\text{C}$ for 10 ± 1 seconds, or $350 \pm 10^{\circ}\text{C}$ for 3.5 ± 0.5 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within $\pm 1\%$.

7.10 Nonflammability:

The resistors are applied the power of 16 times the rated wattage for 5 min. and shall not get flame.

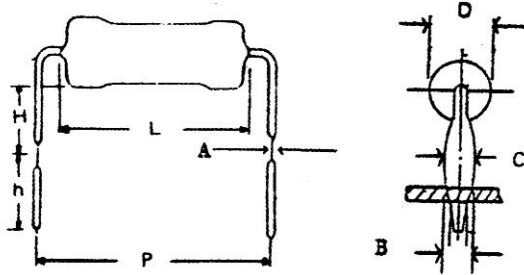
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7.11 Inductance:

It shall be less than 1μ H.

8. Others:

8.1 MG Form:



Unit: mm

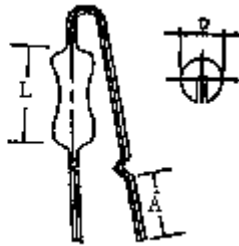
NKNP	$L \pm 1$	$D \pm 1$	P	H	$h \pm 1$	$A \pm 0.02$	$B \pm 0.05$	$C \pm 0.2$
1/2W	9	3	12.5 ± 1.5	7 ± 1	4.5	0.23	0.8	1.2
1W	9	4	15 ± 1.5	7 ± 1	4.5	0.23	0.8	1.2
2W	11	5	15 ± 1.5	7 ± 1	4.5	0.25	1	1.4
3WL	15	5.5	20 ± 2	10 ± 2	4.5	0.25	1	1.4

8.2 F Form:

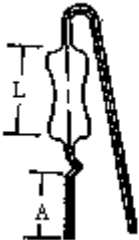
F1



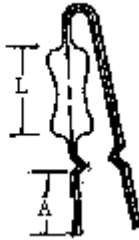
F2



F3



F4



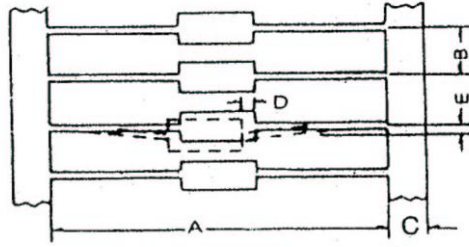
Unit: mm

NKNP	$L \pm 1$	$D \pm 1$	$A +1/-0.5$	APPLICABLE
1/2W	9	3	3.5	F1-F4
1W	9	4	3.5	F1-F4
2W	11	5	3.5	F1-F4
3W	13	5.5	3.5	F1-F4

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8.3 Package:

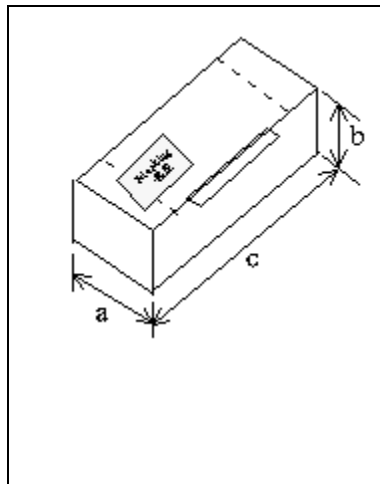
8.3.1 Taping Specifications :



Unit: mm

NKNP	Size		A	B	C±1	D Max	E Max
	Type						
≤1W	T-52		52±1	5±0.5	6	0.6	1.2
2W	T-63		63±1	5±0.5	6	0.6	1.2
3W	T-76		76±1.5	10±1	6	0.6	1.2
3WL	T-76		76±1.5	10±1	6	0.6	1.2

8.3.2 Tape in Box:

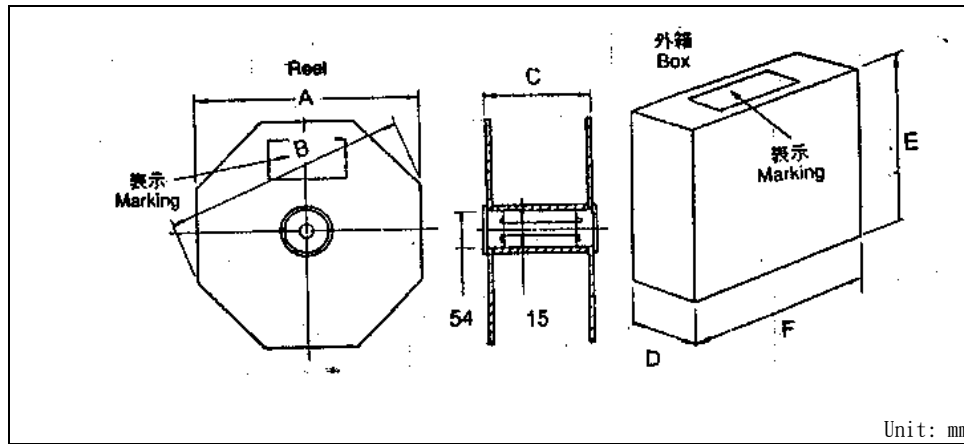


Unit: mm

NKNP	TYPE	QTY PER BOX	a	b	c
1/2W	T-52	1,000	75	55	255
1W	T-52	1,000	75	55	255
2W	T-63	1,000	85	105	260
3W	T-76	1,000	106	110	265
3WL	T-76	1,000	106	110	265

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8.3.3 Tape & Reel:



Unit: mm

NKNP	TYPE	QTY PER REEL	A	B	C	D	E	F
1/2W	T-52	5,000	305	330	75	90	310	310
1W	T-52	2,500	285	310	75	80	295	295
2W	T-63	2,500	285	310	75	80	295	295
3W	T-76	1,000	285	310	90	105	295	295
3WL	T-76	1,000	285	310	90	105	295	295