

# DATA SHEET

## CEMENT RESISTORS

High Power, Axial Lead

SQP Series

NSP Series

$\pm 1\%$ ,  $\pm 5\%$

1W to 40W

RoHS compliant & Halogen Free





**APPLICATIONS**

- Power applications
- Home appliance
- Industry

**FEATURES**

- High power rating
- Excellent pulse load capability
- Axial terminal
- Flameproof ceramic case
- RoHS compliant & halogen-free

**ORDERING INFORMATION**

Part number of the cement resistor is identified by the series, power rating, tolerance, packing, temperature coefficient and resistance value.

**PART NUMBER**

**SQP**   **500**   **J**   **B**   **-**   **22R**  
 (1)   (2)   (3)   (4)   (5)   (6)

**(1) SERIES**

SQP Series = General purpose  
 NSP Series = Non inductive

**(2) POWER RATING**

|          |           |
|----------|-----------|
| 100 = 1W | 10A = 10W |
| 200 = 2W | 15A = 15W |
| 300 = 3W | 20A = 20W |
| 5WS = 5W | 25A = 25W |
| 500 = 5W | 30A = 30W |
| 700 = 7W | 40A = 40W |

**(3) TOLERANCE**

F = ±1% (Wirewound)                      J = ±5%

**(4) PACKAGING**

B = Bulk for wirewound or metal oxide or fiberglass element  
 W = Bulk for wirewound element  
 M = Bulk for metal oxide element

**(5) TEMPERATURE COEFFICIENT OF RESISTANCE**

F = ±100ppm/°C (Wirewound)                      - = Based on spec.

**(6) RESISTANCE VALUE**

E24 & E96 Series  
 Example:  
 100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

**DIMENSIONS**

Unit: mm

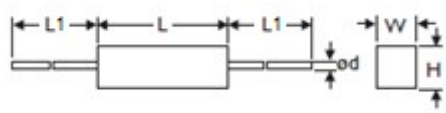
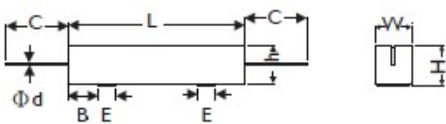
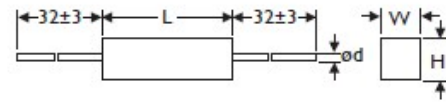
|  | Normal | Non-Inductive | L      | W        | H                                  | $\psi d$  |
|--|--------|---------------|--------|----------|------------------------------------|-----------|
|  | SQP200 | NSP200        | 18±1.0 | 7.0±1.0  | 7.0±1.0                            | 0.65±0.05 |
|  | SQP300 | NSP300        | 22±1.5 | 8.0±1.0  | 8.0±1.0                            | 0.8±0.05  |
|  | SQP5WS | -             | 25±1.5 | 6.0±1.0  | 6.0±1.0                            | 0.65±0.05 |
|  | SQP500 | NSP500        | 22±1.5 | 9.5±1.0  | 9.0±1.0                            | 0.8±0.05  |
|  | SQP700 | NSP700        | 35±1.5 | 9.5±1.0  | 9.0±1.0                            | 0.8±0.05  |
|  | SQP10A | NSP10A        | 48±1.5 | 9.5±1.0  | 9.0±1.0                            | 0.8±0.05  |
|  | SQP15A | NSP15A        | 48±1.5 | 12.5±1.0 | 12.5±1.0                           | 0.8±0.05  |
|  | SQP20A | NSP20A        | 60±5.0 | 12.5±1.0 | 12.5±1.0                           | 0.8±0.05  |
|  | SQP25A | NSP25A        | 60±5.0 | 14.0±1.5 | 13.0±1.5                           | 0.8±0.05  |
|  | SQP30A | NSP30A        | 77±5.0 | 18.0±1.5 | 17 <sup>+2.5</sup> <sub>-1.0</sub> | 0.8±0.05  |

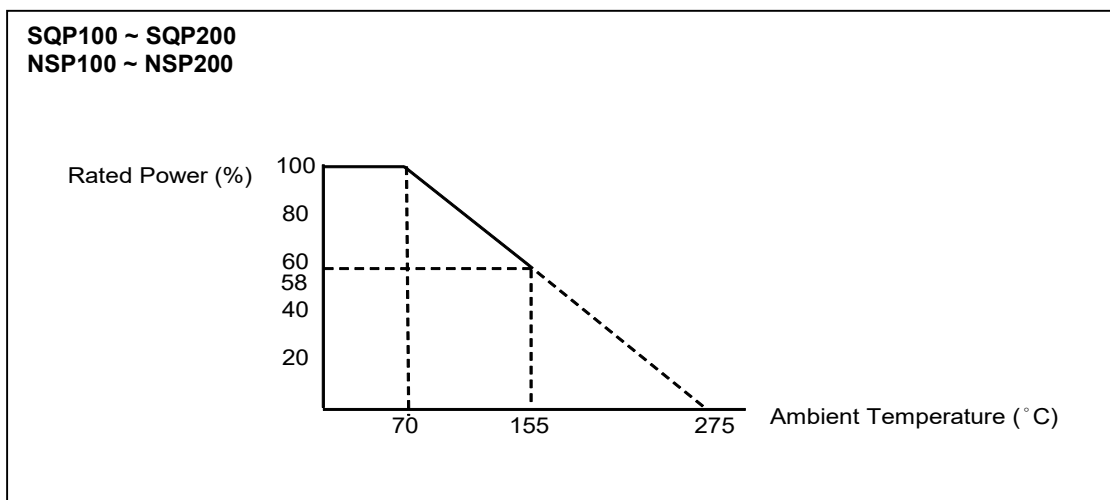
|  | Normal | Non-Inductive | L        | W        | H        | h        |
|--|--------|---------------|----------|----------|----------|----------|
|  |        |               | 90±5.0   | 19.0±1.5 | 20.5±1.5 | 19.5±1.5 |
|  | SQP40A | NSP40A        | <b>B</b> | <b>C</b> | <b>E</b> | $\psi d$ |
|  |        |               | 15.0±1.0 | 32±3     | 9.0±0.5  | 0.8±0.05 |

|  | Normal | Non-Inductive | L         | W       | H       | $\psi d$ |
|--|--------|---------------|-----------|---------|---------|----------|
|  |        |               | 13±1.0    | 5.5±1.0 | 5.5±1.0 | 0.6±0.05 |
|  | SQP100 | NSP100        | <b>L1</b> |         |         |          |
|  |        |               | 28±3.0    |         |         |          |

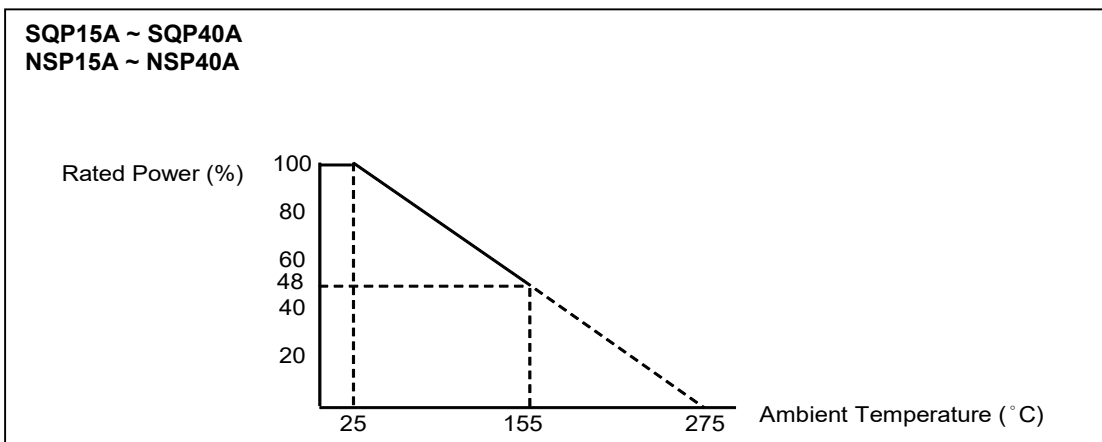
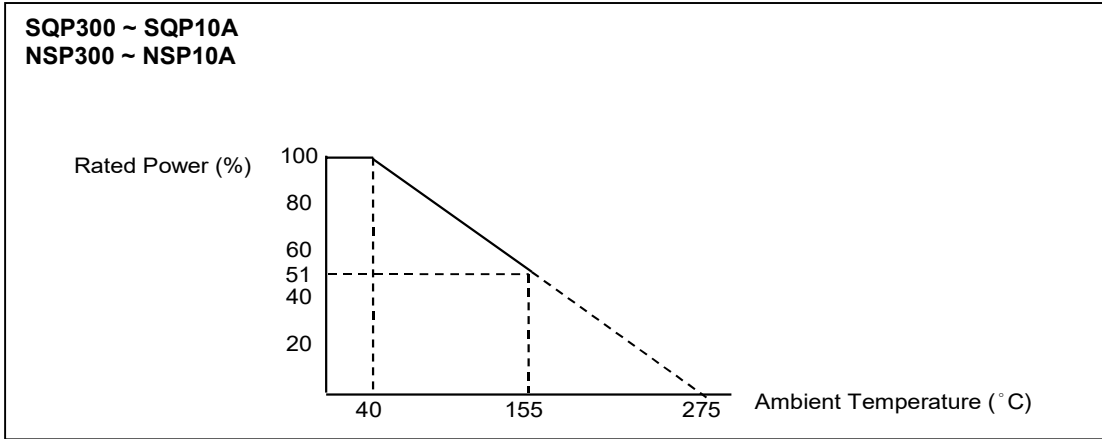


**DERATING CURVE**

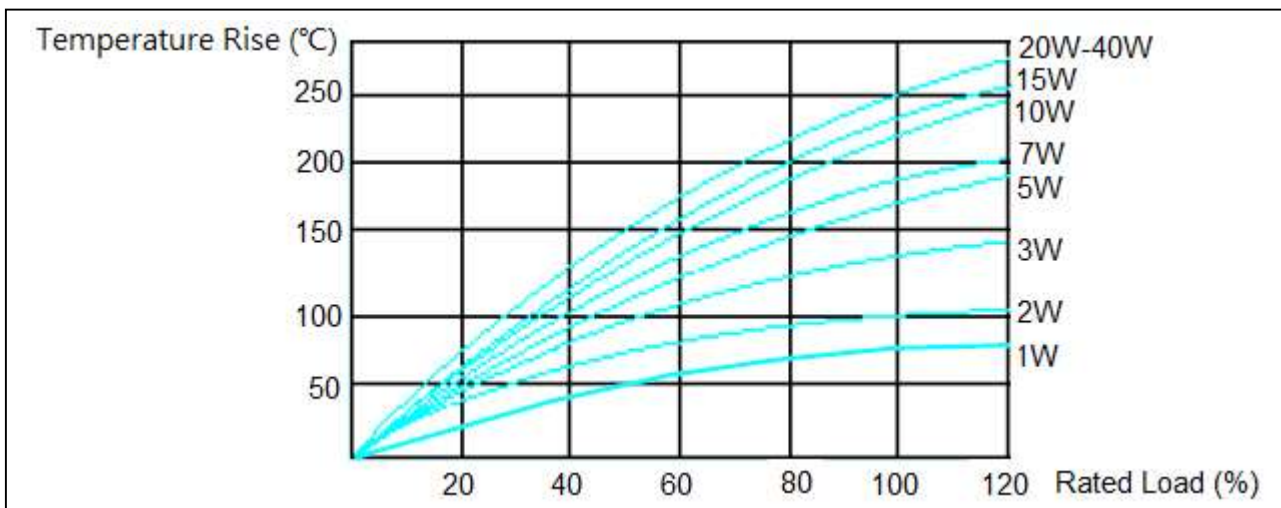


**Cement Resistors**

SQP / NSP



**TEMPERATURE CURVE**



**ELECTRICAL CHARACTERISTICS**

| CHARACTERISTICS              | SQP100   | SQP200      | SQP300       | SQP5WS        | SQP500        | SQP700       | SQP10A       |
|------------------------------|--|-------------|--------------|---------------|---------------|--------------|--------------|
| Power Rating at 70 °C        | 1W   | 2W          |              |               |               |              |              |
| Power Rating at 40 °C        |  |             | 3W           | 5W            | 5W            | 7W           | 10A          |
| Maximum Working Voltage      | 200V   | 250V        | 350V         | 350V          | 350V          | 500V         | 500V         |
| Maximum Overload Voltage     | 500V   | 500V        | 700V         | 700V          | 700V          | 1000V        | 1000V        |
| Voltage Proof on Insulation  | 500V   | 500V        | 700V         | 700V          | 700V          | 1000V        | 1000V        |
| Resistance Range (Wirewound) | 0.1Ω ~ 27Ω   | 0.03Ω ~ 36Ω | 0.015Ω ~ 68Ω | 0.015Ω ~ 130Ω | 0.015Ω ~ 130Ω | 0.05Ω ~ 330Ω | 0.08Ω ~ 510Ω |
| Resistance Range (Film)      | 30Ω ~ 47KΩ   | 39Ω ~ 1MΩ   | 75Ω ~ 1MΩ    | 150Ω ~ 1MΩ    | 150Ω ~ 1MΩ    | 360Ω ~ 100KΩ | 560Ω ~ 100KΩ |
| Operating Temp. Range        | - 55°C to +155°C                                     |             |              |               |               |              |              |
| Temperature Coefficient      | Wirewound :±100ppm/°C , ±300ppm/°C, Film: ±300ppm/°C |             |              |               |               |              |              |

Note: For resistance value out of above range is by request.

| CHARACTERISTICS             | SQP15A                             | SQP20A      | SQP25A      | SQP30A      | SQP40A      |
|-----------------------------|------------------------------------|-------------|-------------|-------------|-------------|
| Power Rating at 25 °C       | 15W                                | 20W         | 25W         | 30W         | 40W         |
| Maximum Working Voltage     | 500V                               | 500V        | 1000V       | 1000V       | 1000V       |
| Maximum Overload Voltage    | 1000V                              | 1000V       | 2000V       | 2000V       | 2000V       |
| Voltage Proof on Insulation | 1000V                              | 1000V       | 2000V       | 2000V       | 2000V       |
| Resistance Range(Wirewound) | 0.1Ω ~ 680Ω                        | 0.15Ω ~ 1KΩ | 0.15Ω ~ 1KΩ | 0.15Ω ~ 1KΩ | 0.15Ω ~ 1KΩ |
| Operating Temp. Range       | - 55°C to +155°C                   |             |             |             |             |
| Temperature Coefficient     | Wirewound :±100ppm/°C , ±300ppm/°C |             |             |             |             |

Note: For resistance value out of above range is by request.

| CHARACTERISTICS             | NSP100                | NSP200      | NSP300       | NSP500      | NSP700      | NSP10A       |
|-----------------------------|-----------------------|-------------|--------------|-------------|-------------|--------------|
| Power Rating at 70 °C       | 1W                    | 2W          |              |             |             |              |
| Power Rating at 40 °C       |                       |             | 3W           | 5W          | 7W          | 10A          |
| Voltage Proof on Insulation | 500V                  | 500V        | 700V         | 700V        | 1000V       | 1000V        |
| Resistance Range(Wirewound) | 0.08Ω ~ 10Ω           | 0.08Ω ~ 10Ω | 0.033Ω ~ 30Ω | 0.03Ω ~ 40Ω | 0.15Ω ~ 65Ω | 0.25Ω ~ 100Ω |
| Maximum Working Voltage     | $\sqrt{(P \times R)}$ |             |              |             |             |              |
| Operating Temp. Range       | - 55°C to +155°C      |             |              |             |             |              |
| Temperature Coefficient     | ±300ppm/°C            |             |              |             |             |              |

Note: For resistance value out of above range is by request.

| CHARACTERISTICS             | NSP15A                | NSP20A          | NSP25A          | NSP30A          | NSP40A          |
|-----------------------------|-----------------------|-----------------|-----------------|-----------------|-----------------|
| Power Rating at 25 °C       | 15W                   | 20W             | 25W             | 30W             | 40W             |
| Voltage Proof on Insulation | 1000V                 | 1000V           | 2000V           | 2000V           | 2000V           |
| Resistance Range(Wirewound) | 0.25Ω ~<br>120Ω       | 0.36Ω ~<br>160Ω | 0.36Ω ~<br>160Ω | 0.36Ω ~<br>160Ω | 0.36Ω ~<br>160Ω |
| Maximum Working Voltage     | $\sqrt{(P \times R)}$ |                 |                 |                 |                 |
| Operating Temp. Range       | - 55°C to +155°C      |                 |                 |                 |                 |
| Temperature Coefficient     | ±300ppm/°C            |                 |                 |                 |                 |

Note: For resistance value out of above range is by request.

## TEST AND REQUIRMENTS

| TEST                          | TEST METHOD      | PROCEDURE   | APPRAISE                                  |
|-------------------------------|------------------|---|---|
| Short Time Overload           | IEC 60115-1 4.13 | 2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)             | ±2.0%+0.05Ω                               |
| Voltage Proof on Insulation   | IEC 60115-1 4.7  | In V-Block for 60 sec. test voltage as above table                            | No Breakdown                              |
| Temperature Coefficient       | IEC 60115-1 4.8  | Between -55°C to +155°C   | By Type                                   |
| Insulation Resistance         | IEC 60115-1 4.6  | In V-Block for 60 sec.  | >1,000MΩ                                  |
| Solderability                 | IEC 60115-1 4.17 | 245±5°C for 3±0.5 Sec.  | 95% Min. coverage                         |
| Solvent Resistance of Marking | IEC 60115-1 4.30 | IPA for 5±0.5 Min. with ultrasonic  | No deterioration of coatings and markings |
| Robustness of Terminations    | IEC 60115-1 4.16 | Direct load for 10 Sec. in the direction of the terminal leads                | ≥2.5Kg(24.5N)D                            |
| Periodic-pulse Overload       | IEC 60115-1 4.39 | 4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec.off)                            | ±2.0%+0.05Ω                               |
| Damp Heat Steady State        | IEC 60115-1 4.24 | 40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV                      | ±5.0%+0.05Ω                               |
| Endurance at 70°C             | IEC 60115-1 4.25 | 70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off) | ±5.0%+0.05Ω                               |
| Temperature Cycling           | IEC 60115-1 4.19 | ➔ -55°C ➔ Room Temp. ➔ +155°C Room Temp.(5 cycles)                            | ±2.0%+0.05Ω                               |
| Resistance to Soldering Heat  | IEC 60115-1 4.18 | 260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body              | ±1.0%+0.05Ω                               |

Note:

**RCWV (Rated Continuous Working Voltage):**

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$V = \sqrt{P \times R}$$

or max. working voltage whichever is less

Where

V=Continuous rated DC or

AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value ( $\Omega$ )

**BULK PACKING**

Unit: Piece

| Normal | Non-Inductive | PACKAGE | Quantity |
|--------|---------------|---------|----------|
| SQP200 | NSP200        | Bulk    | 1,400    |
| SQP300 | NSP300        | Bulk    | 1,000    |
| SQP500 | NSP500        | Bulk    | 900      |
| SQP700 | NSP700        | Bulk    | 600      |
| SQP10A | NSP10A        | Bulk    | 500      |
| SQP15A | NSP15A        | Bulk    | 360      |
| SQP20A | NSP20A        | Bulk    | 360      |
| SQP25A | NSP25A        | Bulk    | 360      |
| SQP30A | NSP30A        | Bulk    | 50       |
| SQP40A | NSP40A        | Bulk    | 50       |

**MARKING**

2W~40W



**Example:**

- YAGEO = Brand
- 1801 = Date code
- 10W = Power rating
- N = Non-inductive
- 100R = Resistance
- J = Tolerance

1W



**Example:**

- 1W = Power rating
- N = Non-inductive
- 10R = Resistance
- J = Tolerance

**REVISION HISTORY**

| REVISION  | DATE         | CHANGE NOTIFICATION | DESCRIPTION  |
|-----------|--------------|---------------------|--|
| Version 4 | Mar.06, 2024 | -                   | - Add marking for NSP series.                              |
| Version 3 | Dec.06, 2023 | -                   | - Revised dimensions and marking for SQP100 & NSP100 types |
| Version 2 | Aug.31, 2023 | -                   | - Revised LEGAL DISCLAIMER                                 |
| Version 1 | Feb.16, 2023 | -                   | - Update packaging quantity of SQP20A&25A                  |
| Version 0 | Aug.2, 2021  | -                   | - First issue of this specification                        |

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