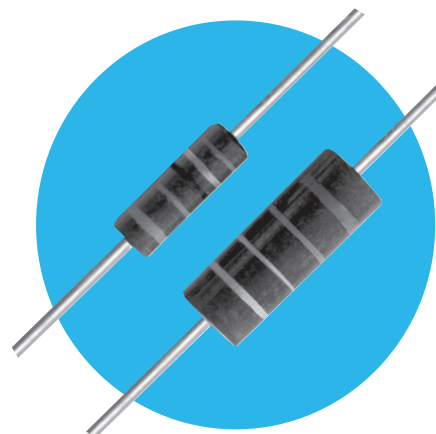


# General-Purpose Failsafe Moulded Wirewound Resistors

## SPH/SPF Series

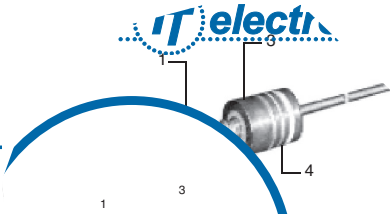
- Drop-in replacement for BWH/BWF
- 2 watt rated with 1 watt dimensions
- $\pm 5\%$ ,  $\pm 10\%$  tolerance
- 0.1 ohm to 2400 ohms
- TCR's as low as  $\pm 150$  ppm/ $^{\circ}\text{C}$  standard (custom TC's available)
- Weldable and solderable leads



 All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

## Electrical Data

|                                 | Type             | SPH<br>SPH                                                                                                  | SPF<br>SPF                                                                                                  |
|---------------------------------|------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 4 Style                         | EIA RS-344 Style | CRU2 CRU2                                                                                                   | CRU2                                                                                                        |
| Style                           | MIL-R-11 Style   | RC32/RC42                                                                                                   | RC32/RC42                                                                                                   |
| Resistance - Std.               |                  | 0.1 $\Omega$ to 2400 $\Omega$                                                                               | 0.1 $\Omega$ to 1000 $\Omega$                                                                               |
| Tolerance - Std.                |                  | 0.1 $\Omega$ to 2400 $\Omega$<br>$\pm 5\%$ , $\pm 10\%$                                                     | 0.1 $\Omega$ to 1000 $\Omega$<br>$\pm 5\%$ , $\pm 10\%$                                                     |
| Power Rating                    |                  | 2 watt @ 70 $^{\circ}\text{C}$<br>1 watt @ 115 $^{\circ}\text{C}$<br>Derating to 0 @ 160 $^{\circ}\text{C}$ | 2 watt @ 70 $^{\circ}\text{C}$<br>1 watt @ 115 $^{\circ}\text{C}$<br>Derating to 0 @ 160 $^{\circ}\text{C}$ |
| Max. Continuous Working Voltage |                  | 2 watt @ 70 $^{\circ}\text{C}$<br>1 watt @ 115 $^{\circ}\text{C}$<br>$\sqrt{\text{PR}}$                     | 2 watt @ 70 $^{\circ}\text{C}$<br>1 watt @ 115 $^{\circ}\text{C}$<br>$\sqrt{\text{PR}}$                     |
| Min. Insulation Resistance      |                  | Derating to 0 @ 160 $^{\circ}\text{C}$<br>10,000 Meg                                                        | Derating to 0 @ 160 $^{\circ}\text{C}$<br>10,000 Meg                                                        |
| Continuous Working Voltage      | ATM              | $\sqrt{\text{PR}}$ 1000V                                                                                    | $\sqrt{\text{PR}}$ 1000V                                                                                    |
| Withstanding Volts              |                  |                                                                                                             |                                                                                                             |
| (RMS) Dry Reduced Pressure      |                  | 10,000 Meg                                                                                                  | 10,000 Meg                                                                                                  |
| Hotspot Temperature Rise        | Wet              | 100 Meg<br>145 $^{\circ}\text{C}$ @ 2 watts                                                                 | 100 Meg<br>145 $^{\circ}\text{C}$ @ 2 watts                                                                 |
| Typical Load Life               | ATM              | 1000V 5%                                                                                                    | 1000V 5%                                                                                                    |
| Current Noise                   |                  | Negligible                                                                                                  | Negligible                                                                                                  |
| Reduced Pressure                |                  | 625V                                                                                                        | 625V                                                                                                        |



**1. Resistive Element**  
All resistor types have resistance alloy winding on a braided fiberglass core. Intermediate silicone coatings are used to enhance processability and to provide protection to the resistive element.

**2. Termination**  
The SPH and SPF resistors are terminated using an alloy coated copper flashless steel lead welded to a cap of the resistor. This termination assembly is mechanically crimped, utilizing an improved crimp design, to the resistive element.

**3. Encapsulation**  
The SPH and the SPF are encapsulated utilizing a compression molded phenolic plastic material. The SPF has a flame resistance coating applied over the resistive element to provide flameproof protection when destructive overloads may occur.

**4. Marking**  
All products are marked with a lead-free, solvent resistant color code bands consistent with EIA/MIL requirements. The first band is double width to designate wirewound construction. A fifth band, blue in color, is used for flameproof identification.

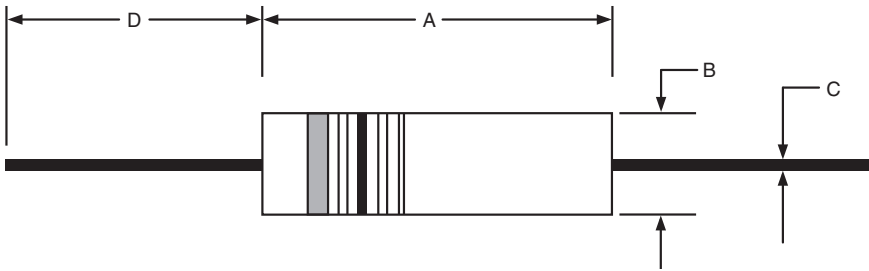
### General Note

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Environmental Data

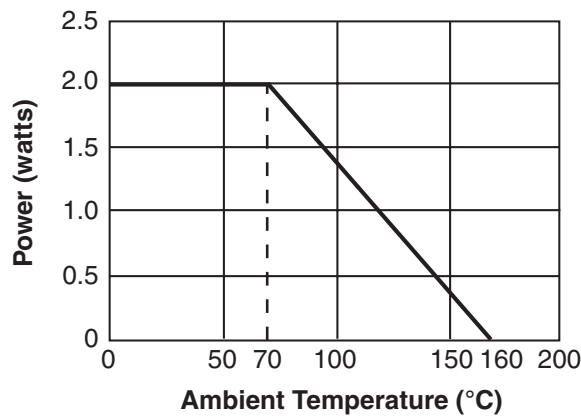
| Test                                  | SPH                                                               | SPF                                                                                |
|---------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Temperature Coefficient (ppm)*        | 0.1Ω - 0.16Ω ± 1000<br>0.18Ω - 0.68Ω ± 800<br>0.75Ω - 2400Ω ± 400 | 0.10Ω ± 1700<br>0.11Ω - 0.16Ω ± 1000<br>0.18Ω - 0.68Ω ± 800<br>0.75Ω - 1000Ω ± 400 |
| Dielectric Withstanding Voltage (RMS) | 1000V                                                             | 1000V                                                                              |
| Momentary Overload                    | 5%                                                                | 5%                                                                                 |
| Low Temperature Operation             | 5%                                                                | 5%                                                                                 |
| Temperature Cycle                     | 5%                                                                | 5%                                                                                 |
| Humidity                              | 5%                                                                | 5%                                                                                 |
| Load Life                             | 5%                                                                | 5%                                                                                 |
| Terminal Strength                     | 5%                                                                | 5%                                                                                 |
| Resistance to Solder Heat             | 5%                                                                | 5%                                                                                 |
| Solderability                         | No Failures                                                       | No Failures                                                                        |

Physical Data

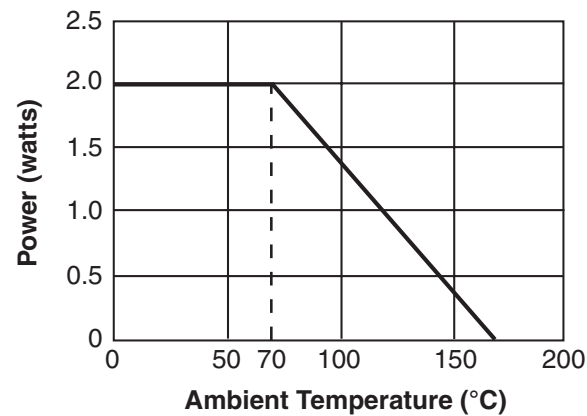
|  |                                |                                |                                 |                              |
|--------------------------------------------------------------------------------------|--------------------------------|--------------------------------|---------------------------------|------------------------------|
| Dimensions (Inches and (mm))                                                         |                                |                                |                                 |                              |
| Type                                                                                 | A                              | B                              | C                               | D                            |
| SPH                                                                                  | 0.562 ± 0.010<br>(14.3 ± 0.25) | 0.225 ± 0.008<br>(5.72 ± 0.20) | 0.032 ± 0.002<br>(0.813 ± 0.05) | 1.50 ± 0.126<br>(38.1 ± 3.2) |
| SPF                                                                                  | 0.562 ± 0.010<br>(14.3 ± 0.25) | 0.225 ± 0.008<br>(5.72 ± 0.20) | 0.032 ± 0.002<br>(0.813 ± 0.05) | 1.50 ± 0.126<br>(38.1 ± 3.2) |

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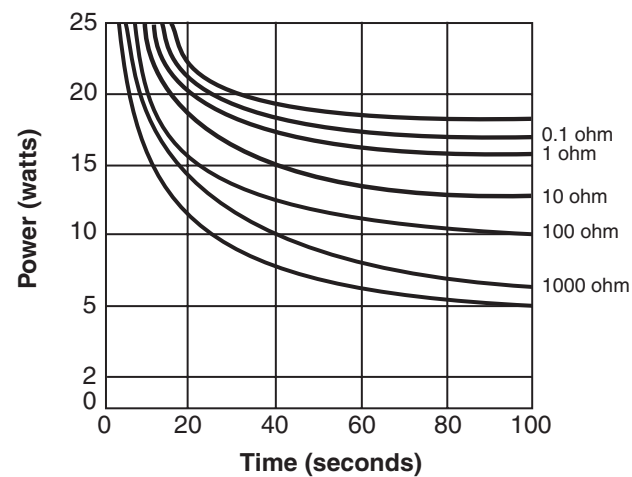
SPH Power Derating Curve



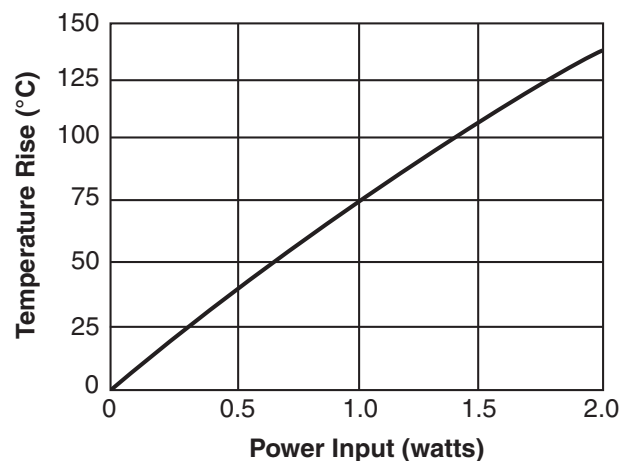
SPF Power Derating Curve



SPF Typical Fusing



SPH and SPF  
Temperature Rise Chart



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# Ordering Procedure

This product has two valid part numbers:

**European (Welwyn) Part Number: SPH-150RJI** (SPH, 150 ohms  $\pm 5\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| S | P | H | - | 1 | 5 | 0 | R | J | I |
| 1 |   | 2 |   |   |   | 3 | 4 |   |   |

| 1<br>Type | 2<br>Value  | 3<br>Tolerance | 4<br>Packing & Termination Finish |
|-----------|-------------|----------------|-----------------------------------|
| SPH       | R = ohms    | J = $\pm 5\%$  | I = Standard packing & Pb-free    |
| SPF       | K = kilohms | K = $\pm 10\%$ | Tape pack 1250/reel               |

**USA (IRC) Part Number: SPH1500JLF** (SPH, 150 ohms  $\pm 5\%$ , Pb-free)

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| S | P | H | 1 | 5 | 0 | 0 | J | L | F |
| 1 |   | 2 |   |   |   | 3 | 4 |   |   |

| 1<br>Type | 2<br>Value                    | 3<br>Tolerance | 4<br>Termination Finish | Standard Packing                                                           |
|-----------|-------------------------------|----------------|-------------------------|----------------------------------------------------------------------------|
| SPH       | 3 digits + multiplier         | J = $\pm 5\%$  | Omit for SnPb           | 1250/reel                                                                  |
| SPF       | R = ohms for values <100 ohms | K = $\pm 10\%$ | LF = Pb-free            | Tape pitch 0.375" (9.5mm)<br>Tape to tape 2.875" (73mm)<br>Leads untrimmed |

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