

# 5 Reasons to Specify Bulk Metal<sup>®</sup> Foil Potentiometers

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Vishay Foil Resistors



## Bulk Metal<sup>®</sup> Foil Technology Trimming Potentiometers

**1. TEMPERATURE COEFFICIENT OF RESISTANCE**

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**2. SETTABILITY**

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**3. SETTING STABILITY**

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**4. LOW NOISE**

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**5. NON-INDUCTIVE DESIGN**

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## Bulk Metal<sup>®</sup> Foil Technology Trimming Potentiometers

### INTRODUCTION

Vishay Precision Trimmers have the Bulk Metal<sup>®</sup> Foil resistive element which possesses a unique inherent temperature and load-life stability. In addition, their advanced, virtually backlash-free adjustment mechanism makes them easy to set quickly and accurately and keeps the setting exactly on target.

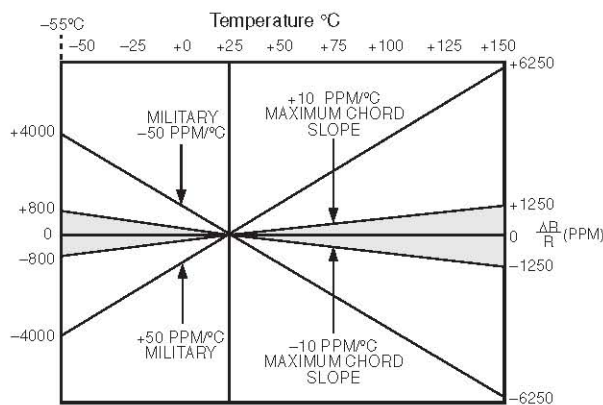
### REASON 1

#### TEMPERATURE COEFFICIENT OF RESISTANCE (TCR)

The Maximum Temperature Coefficient of Resistance of standard Vishay trimmers (except the 1280G & 1285G\*) is +10ppm/°C from -55°C to +25°C, and -10ppm/°C from +25°C to +150°C, which is five times tighter than required by MIL-PRF-39035 characteristic H.

\*The TCR for the 1285G is ± 5ppm/°C  
The TCR for the 1280G is ± 15ppm/°C

**FIGURE 1 - VISHAY TEMPERATURE COEFFICIENT OF RESISTANCE (TCR) COMPARED TO MILITARY STANDARDS**



\* The TCR for the 1285G is ± 5 ppm/°C  
The TCR for the 1280G is ± 15 ppm/°C

This TCR specification is the result of the combination of the Bulk Metal<sup>®</sup> Foil and the matched substrate, which produces an unusually low and predictable TCR.

In real life conditions of changing ambient temperature and temperature gradients, the low TCR of Vishay trimmers plays an important role in both application modes:

- When the trimmer is used as a variable resistor (rheostat), it keeps the resistance value constant and independent of the changes in ambient temperature.
- When the trimmer is used in a voltage divider mode, the two parts of the trimmer's element see different temperatures because of temperature gradients created by heat dissipated by the trimmer and by outside heat sources.

The low TCR minimizes the influence of these gradients on resistances forming the voltage divider, preventing these resistances from drifting apart and thereby keeping the ratio essentially constant.

### REASON 2

#### SETTABILITY

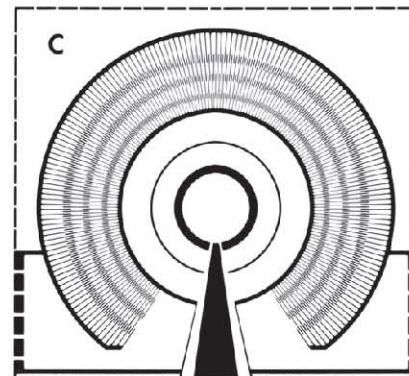
Vishay Trimmers are settable to within 0.1% maximum. The Bulk Metal<sup>®</sup> Foil has a flat, smooth surface containing redundant photo-etched current paths which provide essentially infinite resolution and enhance settability.

### REASON 3

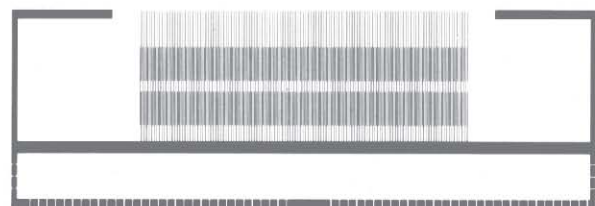
#### SETTING STABILITY

A multi-fingered wiper-brush rides on the Bulk Metal<sup>®</sup> Foil element with a preloaded force to maintain positive contact. The wiper is driven through a 20:1 worm gear (Model 1240 for example) which provides virtually backlash-free resistance adjustment. Together they provide a smooth, linear, resistance-rotation characteristic and exceptional stability when exposed to environmental stresses.

**FIGURE 2 - 1240 TRIMMER ELEMENT**



**FIGURE 3 - 1202 TRIMMER ELEMENT**



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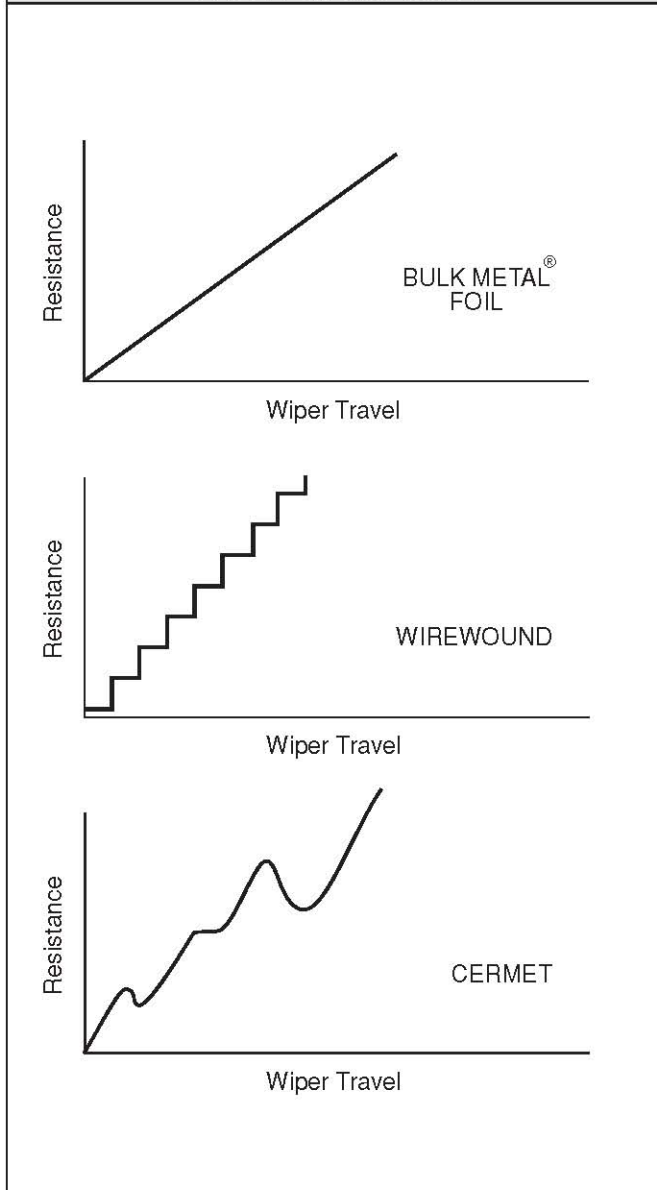
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## 2. SETTABILITY / 3. SETTING STABILITY Continued

**FIGURE 4 - TYPICAL TRIMMER RESOLUTION BY ELEMENT TYPE**

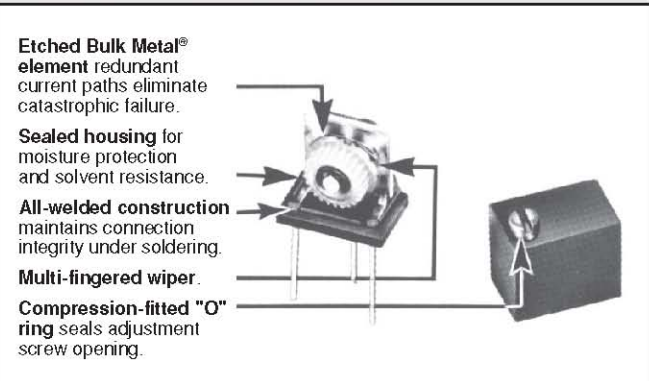


## REASON 5

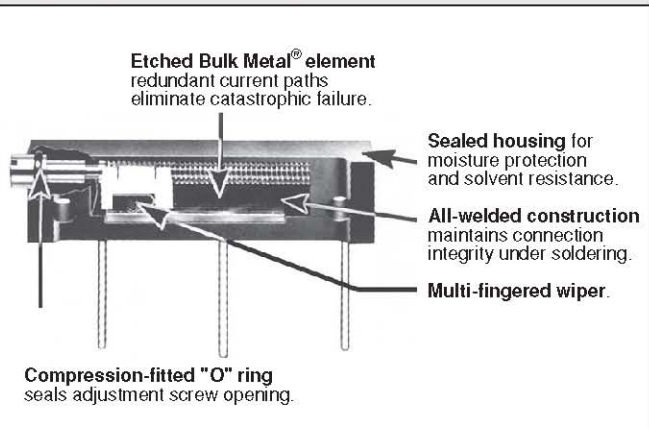
### NON-INDUCTIVE DESIGN

The Vishay resistive pattern design on a flat substrate provides an essentially non-inductive component — 0.08μH typical; with a rise time as fast as 10ns at 1KΩ — excellent for high frequency applications.

**FIGURE 5 - 1240 CUTAWAY**



**FIGURE 6 - 1202 CUTAWAY**



## REASON 4

### LOW NOISE

The flat smooth surface of the Bulk Metal<sup>®</sup> Foil, combined with the metal-to-metal contact between the Bulk Metal<sup>®</sup> Foil and the multi-fingered wiper, provide Vishay Trimmers with extremely low noise.

ALL VISHAY TRIMMERS ARE INSPECTED 100% For:

- Short-time overload (6.25 x rated power for 5 seconds on; and for 30 seconds off — 3 cycles)
- Immersion
- Resistance tolerance check
- End Resistance
- Visual-Mechanical
- Dynamic tests for: Continuity, CRV

By Sample For:

- TCR
- DWV