

## WATCOUPLE Thermocouple Reduces Process Drift



WATCOUPLE saves you money by not only reducing variation in your process but also reducing process drift by lasting longer in the most demanding applications. Watlow's new nonstandard thermocouple gives you a more accurate measurement and exhibits three times less drift as Type K thermocouples. Longer lasting sensors reduce operating and maintenance costs, increasing process uptime and availability. Based on IEEE 1451.4 technology, WATCOUPLE automatically communicates its individual voltage table, calibration, manufacturing and traceability information.

Since IEEE 1451.4 smart sensor technology enables the sensor to include its own voltage table, WATCOUPLE thermocouples were developed to use alternative metals that are far more accurate, stable and more readily available. Traditional thermocouples were primarily designed for linearity, and have complicated alloys that compromise their accuracy, stability and longevity. The WATCOUPLE is a nonstandard thermocouple that uses alloy 600 and nickel-silicon to make a thermocouple that is four times more accurate than Type K special limits, and lasts three times longer with three times less drift than Type K. A WATCOUPLE is more accurate than class A RTDs above 100°C (212°F), and being a thermocouple has natural advantages, such as having very high temperature limits in small sizes.

### Available Options

- Available in all standard sizes and configurations

### Applications

- Aerospace
- Chemicals, oils and gas, and petrochemical refining
- Furnace, heat treat
- Metals, mining and glass processing
- Power generation
- Semiconductor
- Test stands

### Features and Benefits

#### Improved accuracy and stability

- Improves accuracy by four times than that of Type K thermocouples in applications
- More accurate than class A RTDs above 100°C (212°F)
- Lasts three times longer and provides three times less drift than Type K thermocouples
- Eliminates aging effects and green rot

#### Customizable

- Available in all sizes
- Automated and error-proof linking of your application to Watlow's NIST-traceable calibration lab

#### Very high temperature limits in small sizes

- Maximum peak temperature rating of 1316°C (2400°F)
- Maximum continuous temperature rating of 1177°C (2150°F)



## WATLOW

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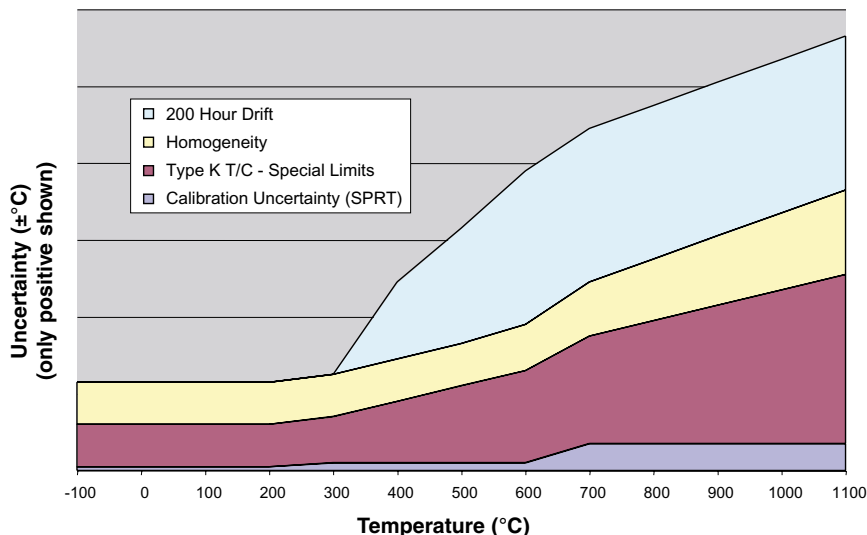
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**PRELIMINARY**

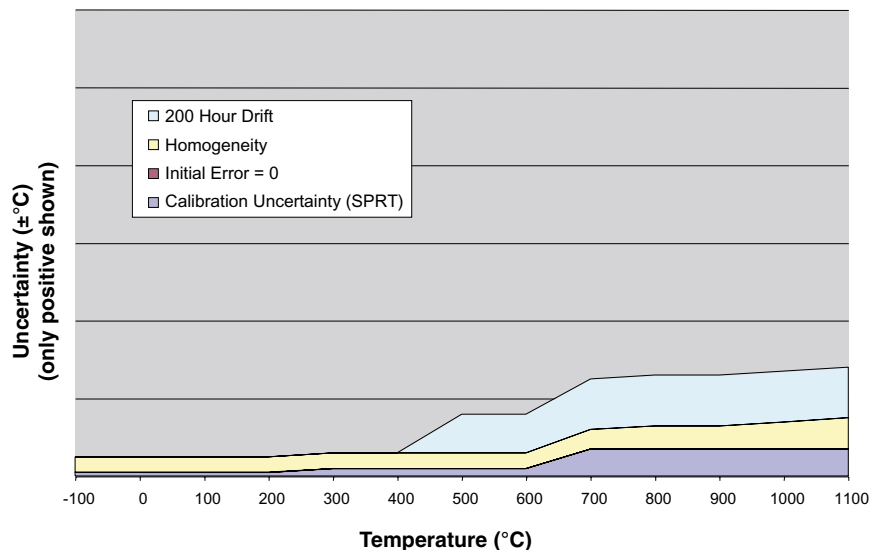


## Uncertainty in Type K Special Limits Thermocouple



This chart shows the cumulative uncertainty with bulk material calibrated Type K thermocouples (similarly J, E or N). Special limits of error for most thermocouples is a tolerance window that is defined as plus or minus 1.1°C or plus or minus 0.4 percent, whichever is greater. Additional uncertainty exists as the calibration uncertainty, homogeneity and two hundred hours of drift are accounted for. The significant portion of the error contributed by drift not only changes with time, but is unique to each sensor and bulk lot of material. This error is the least controllable source of uncertainty in standard thermocouples.

## Uncertainty in WATCOUPLE Thermocouple



An IEEE 1451.4 transfer of the calibration information improves sensor accuracy by nullifying the initial tolerance assumption as shown. In addition, the drift error and homogeneity error is greatly reduced through the superior metallurgical properties of the alloy 600 and nickel-silicon thermoelements. The drifting output of the thermocouple in the application is significantly reduced, resulting in a sensor that lasts multiple times longer. Also these materials have better homogeneity and are more repeatable from sensor to sensor. Further improvement can nullify the homogeneity error by using a more expensive individual sensor characterization rather than the bulk material calibration information.

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