

## Accurate, Repeatable, Fast Response in Perpendicular Surface Measurement

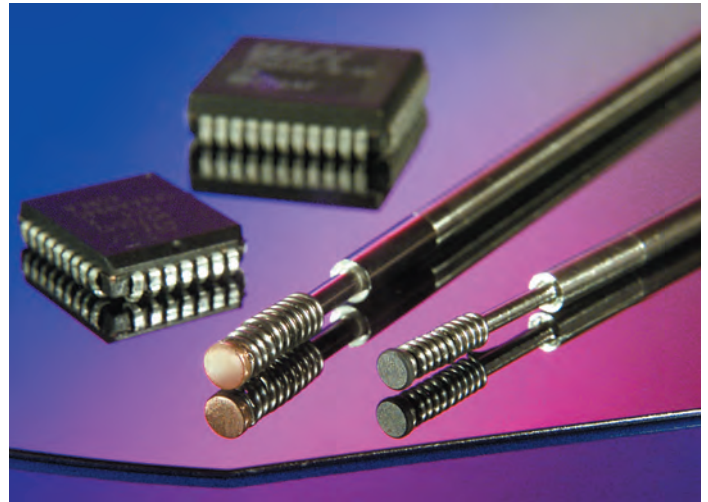
Watlow's new MICROCOIL miniature thermocouple provides surface temperature measurements with an unparalleled degree of accuracy. This patent pending technology achieves critical isothermal surface temperature measurement and offers superior design flexibility.

Typical sensor to sensor repeatability of one to two percent ( $\Delta T$ ) can be achieved with the MICROCOIL because the areas of the sensor that are vulnerable to normal production variances are not in the thermal gradient. Weld location, insulation thickness and welded tip thickness no longer impact measurement in an isothermal environment. Therefore, the inherent disadvantages of measuring surface temperatures are no longer a problem with the MICROCOIL.

The MICROCOIL thermocouple utilizes Watlow's XACTPAK® mineral insulated thermocouple cable, which with an ungrounded junction will electrically isolate the circuit from the surface being measured. For higher voltage applications, ceramic sensor discs can be used for additional protection.

The MICROCOIL thermocouple is designed for demanding applications including chambers, wafer supports, heat sinks, chip cases, platens, packaging, cleaning and food preparation. It measures maximum continuous temperatures up to 1292°F (700°C).

Depending on application requirements for temperature and material compatibility, the MICROCOIL thermocouple can employ a wide range of sensor disc materials. Metals and ceramics can be used to customize response time, accuracy, contamination levels and electrical isolation.



### Features and Benefits

#### Miniature size

- Footprint can be as small as 0.110 inch diameter
- Allows for precision measurement in tight spaces
- Single, isolated, ungrounded junctions in XACTPAK as small as 0.010 inch diameter
- Dual, isolated, ungrounded junctions in XACTPAK as small as 0.032 inch diameter

#### XACTPAK mineral insulated thermocouple cable

- Electronically isolated and shielded

#### 1292°F (700°C) maximum continuous temperature

- Offers exact measurement for demanding applications

#### Self leveling and loading

- Provides superior repeatability of measurement for a wide variety of surfaces

### Applications

- Environmental chambers
- Wafer supports
- Heat sinks
- Chip cases
- Platens
- Packaging
- Cleaning
- Food preparation



## WATLOW

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**Patents Pending**



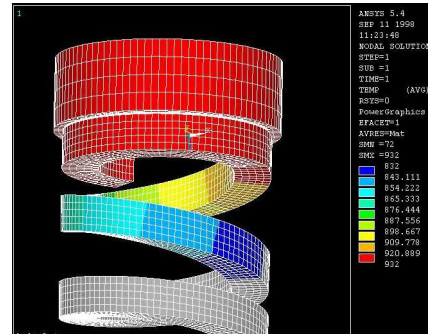
The helix design of the MICROCOIL demonstrates a faster response time because the surface temperature needs to conduct only through the diameter of the cable and the thickness of the sensor disk.

The thermal analysis to the right demonstrates the superior performance of the MICROCOIL technology. This patent pending method achieves the critical isothermal area for a long length of the very small cable, therefore insuring accurate and repeatable measurement.

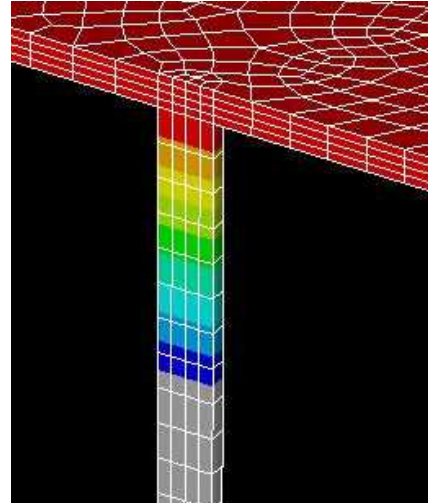
Standard straight sensors exhibit problems including poor accuracy response time and non-repeatable results as well as errors of 20, 30 percent or more.

### Options

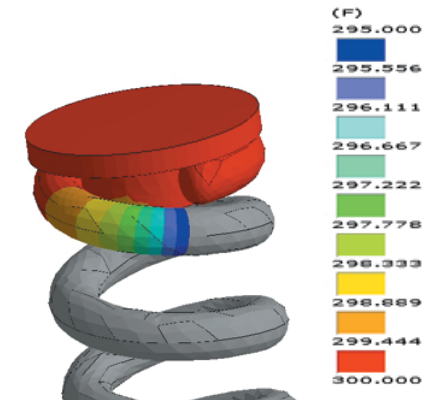
- Dual, isolated thermocouples in the same sensor
- Ungrounded or grounded junction(s)
- Type J or Type K
- RF / IR shield
- Shielded lead wire with drain, either isolated from or connected to the sensor sheath
- Individual sensor calibration



**MICROCOIL Thermal Analysis**



**Straight Thermocouple Thermal Analysis**



**MICROCOIL Thermal Analysis using ANSYS® DesignSpace®**

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