CLEVELAND ELECTRIC LABORATORIES
Thermocouples & Sensing Solutions since 1920

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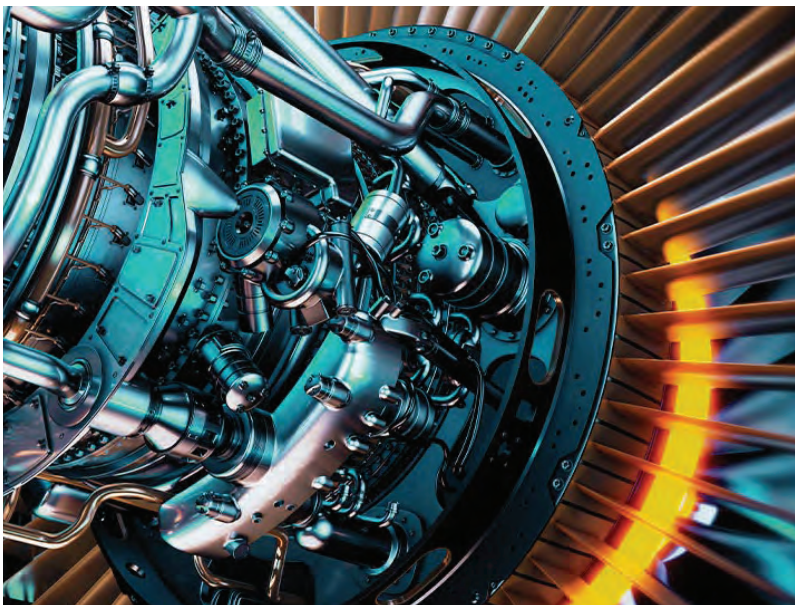
Platinum Composite Sheath Thermocouples

Platinum Composite Sheath Thermocouples enable flexible and responsive temperature measurement with a compact and cost-effective package design in environments where Base Metal Mineral Insulate Metal Sheathed cable would be unable to survive. Excellent option when an extended length probe is necessary but only a portion of the sheath length is exposed to extreme heat.



To achieve this Cleveland Electric Laboratories begins with two noble metal thermocouple wires that will each extend the full length of the thermocouple in one continuous piece. Crushable ceramic insulators are then threaded over the conductors. This insulation is typically made of high-purity Alumina but Hafnia or other insulations can also be used depending on the application and maximum usage temperature.

Separately a sheath is prepared. The length of the sheath that will see full temperature is made from Platinum or a Platinum/Rhodium blend. The remainder of the sheath is typically made of Inconel. These two sheath pieces are then fused together to create a seamless transition and the wire/insulator assembly is inserted into the sheath. The entire assembly is then prepared and compacted resulting in a longer and slightly thinner thermocouple wire free of any internal voids. The full assembly is then annealed to relieve any work stress and enable the greatest flexibility.

The hot end of the assembly is then junctions per specification and hermetically welded closed. The cold end is then terminated with exposed leads, industry-standard plug/jack or transitioned to soft wire.

The resulting assembly retains all the best qualities of the parts that it consists of with a significant cost reduction in comparison to a full Noble metal sheath. These assemblies are extremely flexible and may be bent to achieve small radii down to 4X the sheath diameter. The sheath materials have a high thermal conductivity to enable low-latency measurements and quick response times. The Noble metal sheath is also highly impervious to most chemicals and atmospheres

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while simultaneously highly resistant to mechanical and thermal shock. All of these qualities contribute to extended service life, exceptional accuracy and low drift.

All of CEL's Platinum Composite Sheath Thermocouples are made to order. There are countless options in regard to combinations of wire Type, insulation, sheath material and finished size. All of these choices should be made after considering the temperatures involved, test time duration and other environmental factors such as shock, vibration and duty-cycle.

Features:

- Seamless transition between differing sheath materials
- Extreme temperature
- Highly accurate
- Flexible.

Applications
Gas Turbine Testing

Technical Data	
Calibration	B, R & S
Sheath Diameters	.020 – .250
Termination	Termination Options
Certification	Individual or Lot Certification available upon request

Applications for Platinum Composite-Sheath Thermocouples

Some unique applications require flexible thermocouples, with high-temperature materials across a short length of the sheath nearest the junction, but not across the entire length of the thermocouple. Composite sheath thermocouples, Type B, R or S, offer a Platinum alloyed sheath material on the hot-end with a seamless transition to standard Inconel sheathing for the remaining length. The overall build yields a finished product suitable for extreme temperatures only where your application requires. Our CST's are designed to reduce overall cost without compromise in performance.

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