

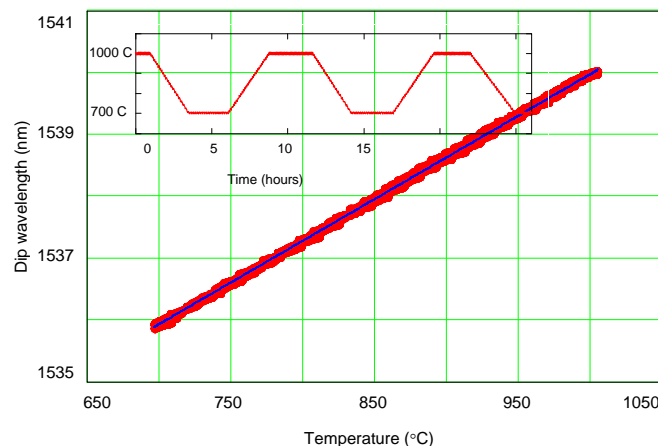


Helica™ Fiber-Optic, Ultra-High Temperature Sensor

A fiber-optic sensor element is now available for applications requiring accurate measurements to 1000°C.

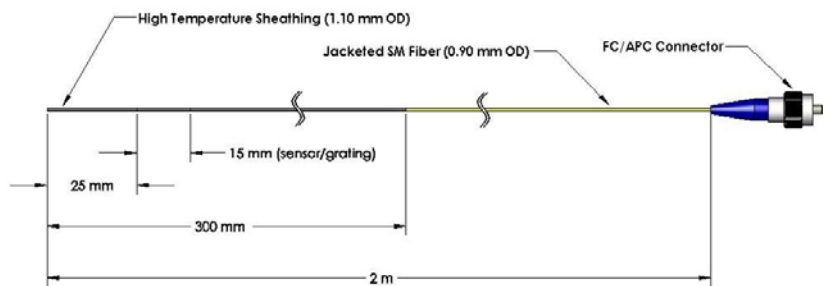
This product is based on Chiral Photonics' chiral grating, fabricated by twisting a fiber as it is passed through a miniature heat zone to produce a distinct dip in the transmission spectrum. The spectral position of the dip in this chiral fiber changes with temperature allowing it to be used as a temperature sensor.

Temperature testing was carried out in a computer-controlled high-temperature oven in which the temperature was monitored by a thermocouple. Both long-term temperature stability and temperature



sensitivity were tested using a Micron Optics fiber interrogator to monitor sensors as they were cycled from room temperature to 1000°C. Use of the interrogator reduces the characterization and testing time and increases the accuracy with which the dip position can be measured. In addition, the dip position can be traced in real time. A micro-mirror may be attached to each chiral fiber so that they can be characterized in reflection, as required by the interrogator. We find that the dip wavelength shifts to the red by approximately 1.3 nm as the temperature is raised by 100 °C. The figure shows the wavelength of transmission dip of a chiral fiber versus temperature. The temperature

was cycled five times from 700 °C to 1000 °C in the course of 24 hours, dwelling for 3 hours at these temperatures. The inset shows the temperature variations. As seen in the figure, the chiral fiber is capable of reliably measuring temperature up to 1000 °C with better than +/- 1% accuracy.



Specifications	
Temperature Range	Up to 1000 °C
Accuracy	1%
Sensitivity	0.01 nm/°C (nominal)
Probe (metal sheathing) Length	300 mm standard - <i>Other lengths available upon request</i>
Sensor/Grating Length	15 mm - <i>Other lengths available upon request</i>
Sensor Placement	25 mm from probe tip - <i>Other configurations available upon request</i>
Connector Type	FC/APC - <i>Other connectors available upon request</i>
Packaging	See Drawing - <i>Other configurations available upon request</i>

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