

Temperature Coefficient for Polyimide Coated Low Bend Loss Fiber: -40°C to 200°C Range

Luna utilizes swept-wavelength interferometry to interrogate fiber optic temperature sensors. By comparing locally-reflected spectra between two measurements of the same sensor, the local spectral shift is calibrated to temperature change. This results in the ability to make numerous temperature measurements at mm-length spatial resolution along a sensor.

- This Technical Note describes the methods employed to obtain a temperature coefficient for Luna's temperature sensor in the -40°C - 200°C range
- The temperature response over a wide temperature range exhibits significant non-linearity. Thus a linear fit with coefficient -0.638 °C/GHz results in a maximum deviation of 10.63°C
- A quartic fit with coefficients of -7.80E-1°C/GHz, -7.96E-4 °C/GHz², -1.57E-6°C/GHz³, and -1.57E-9°C/GHz⁴, (calculated for a tare at 0°C) results in a much reduced maximum deviation of 0.28°C
- A piece-wise linear fit of the data also results in reduced deviation
- Humidity effects are a significant factor in temperature measurements and should be controlled, for best measurement accuracy