

Temperature Measurements on Gas Turbine Components Using Optical Fibers

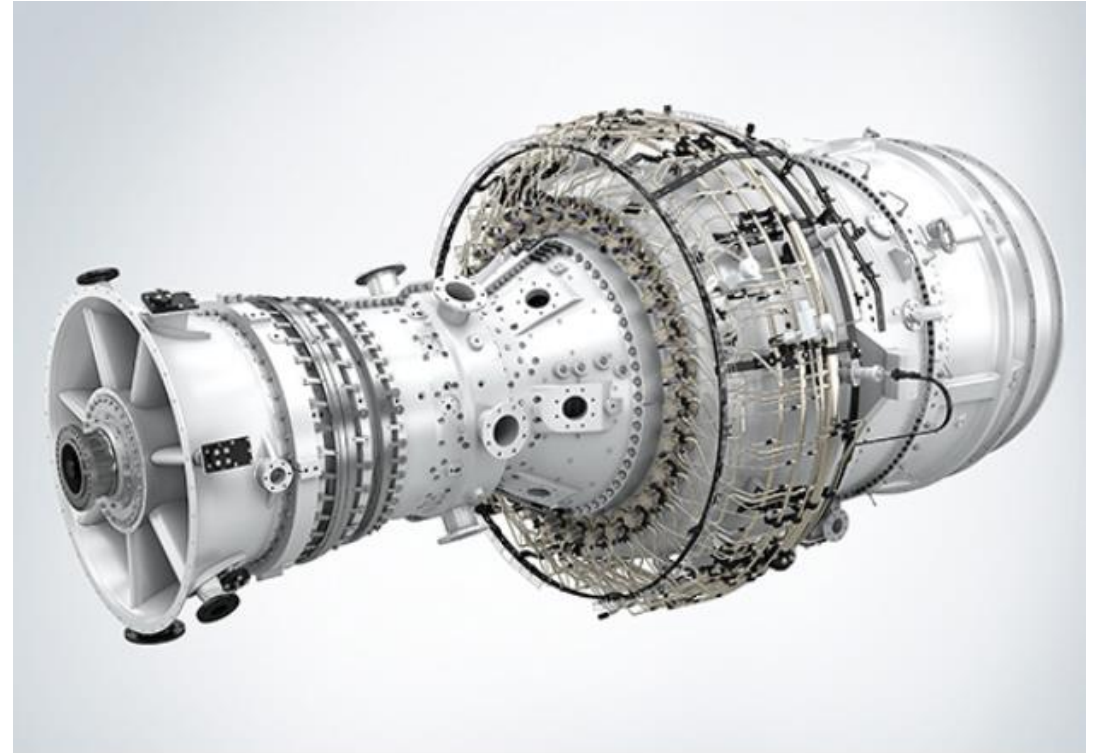
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What we do at Siemens

- Surface temperature measurements
 - Stationary components
 - Rotating components
 - Pure metal components, high- ϵ painted components
- Temperature range 300 °C – 1100 °C
- 1 Hz – 2 MHz Sampling frequency



Recent measurements

- Measurements on 2 components of the SGT-800 engine.
- Measurement temperature range 300 °C – 650 °C.
- Au-coated Fused Silica fiber
 - 300/330/380G
 - Sapphire lens Ø 2 mm
- 1 meter of the fiber is inside the engine.



Challenges and outcome from recent measurements

- 40-50 °C higher temperatures with the fibers compared to thermo couples and calculations.
- Part of the fiber is exposed to surrounding temperatures up to 550 °C.
 - Thermal stress -> Less attenuation ?
- Sapphire lens – fiber materials interaction at high temperatures?
- Close to the acceptable bending radius for some part of the fiber.



Future topic: Rotating components with higher temperatures and higher sampling frequency.

Contact information



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