

Technology Opportunity

Probe for Measuring High Gas Temperatures

The National Aeronautics and Space Administration (NASA) seeks to transfer a NASA-developed probe designed to measure gas temperatures as high as 4000 °F (2204 °C) in oxidizing environments.

Potential Commercial Uses

- In situ measurement of combustor temperatures in commercial and automotive gas turbines.
- Direct measurement of melt temperatures in the steel and glass industries.

Benefits

- No optical access is required.
- Knowledge of the temperature profile in a combustor assists in NO_x control.
- Direct measurement of combustor temperature can be used to verify computational fluid dynamics (CFD) codes.
- A more durable probe for measuring the melt temperature in steel or glass making will assist in process control.



National Aeronautics and
Space Administration
Glenn Research Center



The Technology

The probe (shown in the photograph) consists of a type C (W5%Re versus W26%Re, in weight percent) thermocouple within an argon-filled beryllium oxide (BeO) tube. Although the tungsten-rhenium thermocouple is usable above 5000 °F (2760 °C), at these temperatures it must be used in an oxygen-free environment, such as a vacuum or an inert gas. Beryllium oxide was chosen to enclose the thermocouple because of its high melting point (4600 °F, 2538 °C), excellent resistance to thermal shock, and good electrical properties at high temperatures. A similar probe survived four excursions from room temperature to 3700 °F (2038 °C) at 5 atm in an enclosed burner before being destroyed by debris when the burner liner cracked.

Options for Commercialization

No applicable patent; none applied for. Seeking partnership with industry for nonaerospace applications.

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Key Words

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Reference

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