LeakDefender™ thermocouples

LeakDefender™ thermocouples provide continuous, in-situ monitoring of quartz sheath integrity in ASM Epsilon® or Intrepid® epitaxial reactors. By detecting hydrogen gas leakage in real time, the system provides an early warning of thermocouple sheath failure, allowing the reactor to be safely shut down before product loss, equipment damage or safety risks occur.

Real-time gas leak detection for ASM Epsilon® reactors

Early leak detection helps maximize thermocouple life, reduce unscheduled maintenance and protect valuable wafers from preventable defects.

KEY BENEFITS

- Minimize wafer loss through real-time leak detection
- Improve process yield by reducing surface defects caused by sheath leaks
- Reduce unplanned downtime with early failure detection
- Increase equipment safety by identifying leaks before they reach the cleanroom environment
- Lower cost of ownership by limiting failures and extending maintenance intervals
- Seamless integration with OEM digital input and system controllers
- Fast installation, typically completed within a single shift

DESIGNED FOR RELIABLE PROTECTION

LeakDefender™ offers significant operational and process advantages:

FEATURE	BENEFIT
Real-time hydrogen monitoring	Detects sheath failure before wafer defects occur
Early atmospheric leak detection	Reduces excessive chamber coating and process variation
Configurable control outputs	Enables immediate reactor shutdown
In-situ monitoring	Helps prevent costly chamber damage and maintenance events
Off-the-shelf integration	No specialized equipment required for implementation

TYPICAL APPLICATIONS

- ASM Epsilon® and Intrepid® epitaxial reactors
- High-temperature semiconductor processing
- Applications where thermocouple reliability is critical to yield and uptime

Contact us with your requirements. We will happily work with you to find the best configuration!

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HOW IT WORKS

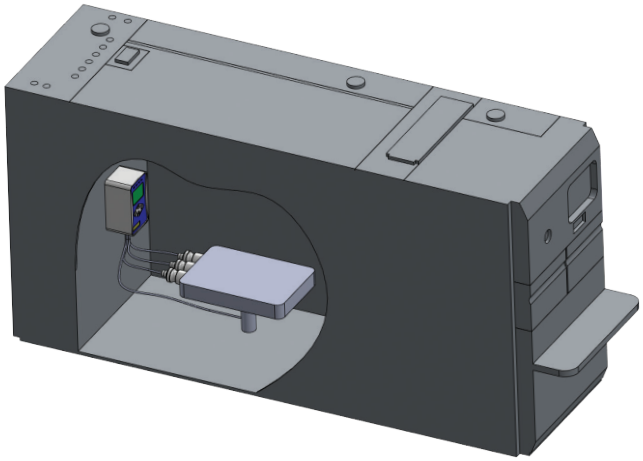
Hydrogen permeating through a damaged quartz sheath is one of the earliest indicators of thermocouple failure. LeakDefender™ thermocouples continuously sample the internal gas path and route it to a dedicated hydrogen monitoring system.

If a sheath breach is detected, the monitoring system immediately triggers configurable control outputs, enabling rapid reactor shutdown before contamination or extensive chamber damage can occur.

TYPICAL REACTOR SCHEMATIC

Depending on process chamber type, a typical reactor has two or three LeakDefender™ thermocouples installed in the horizontal orientation and one LeakDefender™ Center thermocouple installed in the vertical orientation.

Gas monitoring lines exit each of the LeakDefender™ thermocouples and are routed into the TC Sentry System™ ** gas monitor. If a premature thermocouple sheath breach condition occurs, this in-situ monitoring system will detect the leak and prevent product loss and major unplanned maintenance events.



LEAKDEFENDER™ CONTROL OUTPUTS

The TC Sentry System™ gas monitor is capable of detecting minute volumes of hydrogen and triggering one or more control outputs. The ultra-fast detection and response of the system will prevent product loss and contamination of items internal to the process chamber.

** TC Sentry System™ is a registered trademark of Helios Technical Services.

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