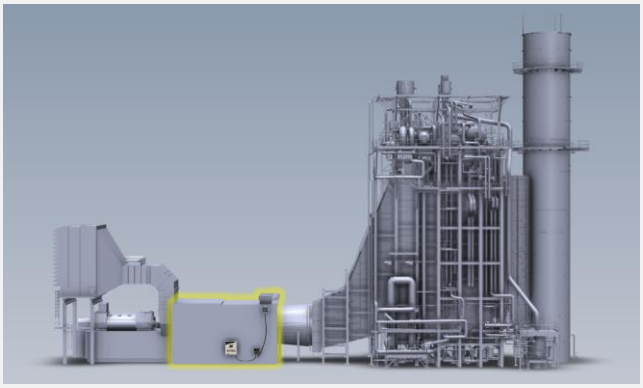
BOREAL

Turbine Enclosure Monitoring

Laser Based - In-Situ Methane (CH_4) Monitoring

Application / Challenges



Methane Detection within the Turbine Enclosure

Leak Detection in the Turbine Enclosure
Monitoring for natural gas within the enclosure

Challenging High Temperature Application
Temperatures in enclosure reach 175°C (350°F)

Maintenance Burden of Cat. Bead Sensors
High Temps. = Significant Drift + Reduced Life Span

No Access to Enclosure while Operational
This drove the necessity for redundant sensors

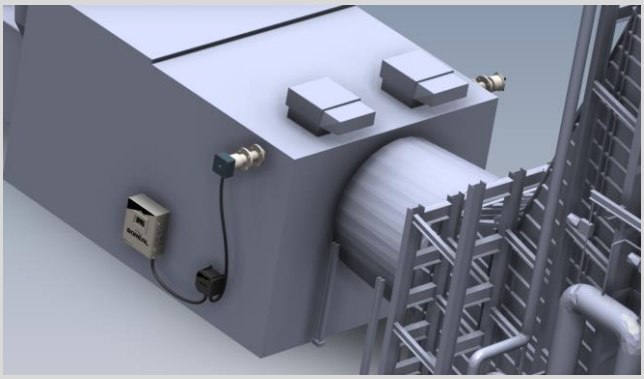
Operational Advantages

No Internal Enclosure Access Required
All equipment is mounted outside of the enclosure

No Electronics Directly Exposed to the Heat
This means longer life span of the equipment

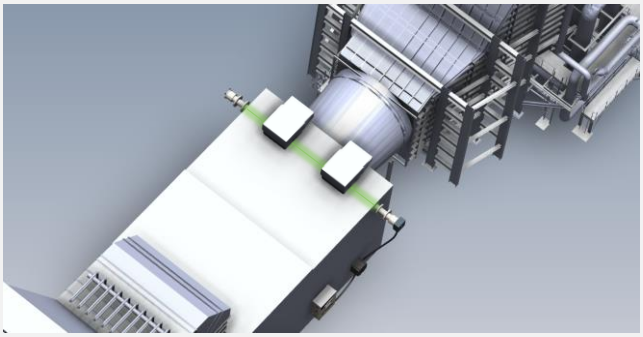
No Replacement Sensors Required
Laser light not damaged by high temperatures

No Calibration + No Measurement Drift
Automatic adjustments made by Reference Cell



GasFinder3-MC shown with Stack/Duct (SDX) Probe

Enhanced Sensing Element



Both Exhaust Vents covered with Stack/Duct (SDX) Probe

Fail Safe Design + SIL2 Suitable
Diagnostics with no undisclosed failure modes

Large Area Coverage
Actively monitoring the length of the enclosure

Fast Speed of Response
1 Second Response (vs. 30 Seconds w/ Cat. Bead)

Low Methane Detection Thresholds
Early detection enables faster intervention

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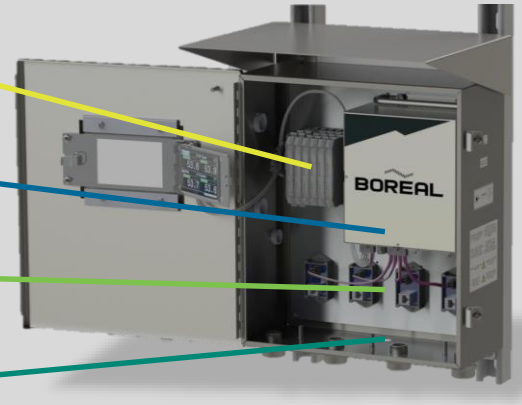
GasFinder3-MC (Multi-Channel)

Power (24 VDC) + Communication Outputs
HART 7 via Analog, Relay Outputs, MODBUS, Etc.

Automatically Validate with Actual Gas
Internal Reference Cell interrogated once a minute

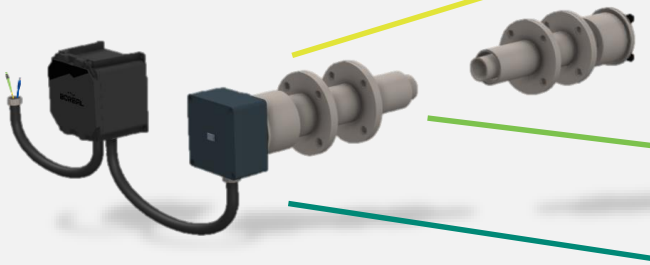
Multi-Channel + Dual Gas Capabilities
Up to Four (4) Stack/Duct (SDX) Probes can be used

Certified for use within a Hazardous Area
(A)Ex nA IIC T5 Tamb <65°C (149°F) (Equiv. C1, Z2)



Note: Two (2) and Four (4) Channels GasFinder3-MC options available

Stack/Duct (SDX) Probe Assembly



Stack/Duct (SDX) Probe
Only the laser beam enters the hot enclosure

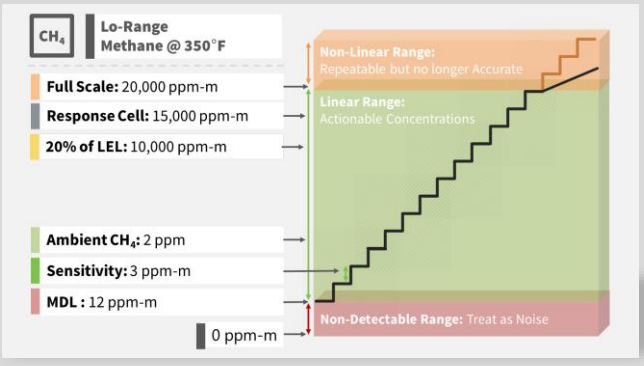
High -Temperature Retro-Flange
Returns laser beam to the Stack/Duct (SDX) Probe

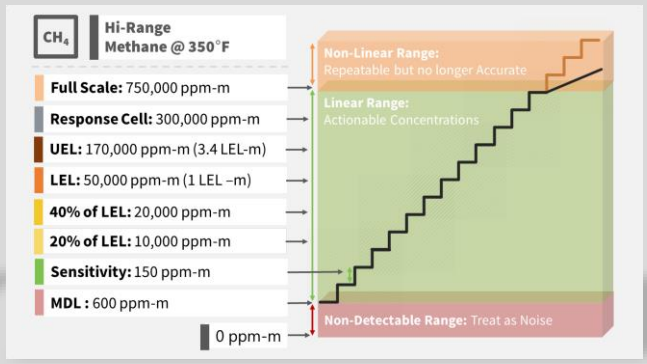
Purge Insert (Recommended Accessory)
Purge (or vacuum) used to cool and clean windows

Cabling + Measurement Head Junction Box
Cabling may be up to 200 m (650 ft) in length

Gas Temperature Range: -55 to 200°C (-67 to 400°F). **Gas Pressure Range:** 50 to 200 KPaA (7.25 to 29 PSiA). **Accuracy:** +/- 5% of Full Scale.

Detectable Ranges for Methane





Path Average Concentrations (ppm) can be determined by dividing the **Path Integrated Concentrations (ppm-m)** by the **Path Length (m).**

Ask your Local Distributor for

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LIVE VIDEO DEMO | **DESIGN CONSIDERATIONS** | **DATA SHEETS** | **GENERAL ARRANGEMENT**

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