

"Changing the way industry looks at gas sensing"

GasFinder

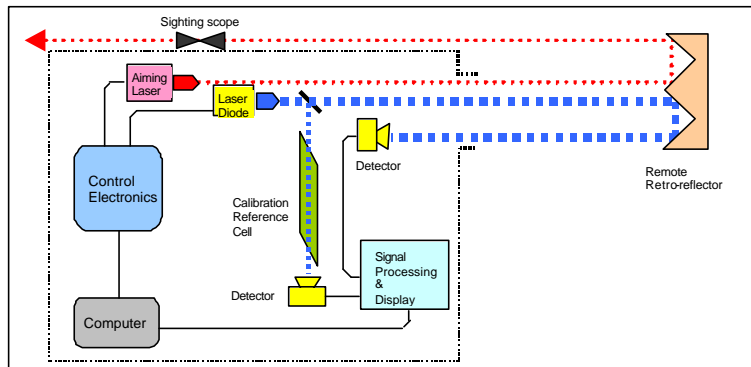
How GasFinder works

Boreal Laser's GasFinder & GasFinder MC are open-path gas detectors that use an integrated transmitter/receiver unit and a remote, passive retro-reflector.

In GasFinder (see below) the transceiver also houses the laser diode, drive electronics, detector module and micro-computer subsystems. The transceiver unit is contained in an IP65 enclosure and has connectors for power input and data I/O. Laser light is emitted from the transceiver through the atmosphere to the reflector and back. The return light is focused onto a photodiode. A portion of the laser beam is passed through an onboard reference cell to provide a continuous calibration update. These two optical signals are then compared to determine the actual concentration of gas along the optical path. The computed gas concentration is displayed on the back panel of the instrument as well as being transmitted to a computer where the data may be displayed and stored.

In GasFinder MC a small Central Control Unit (CCU) contains the laser, electronics and computer. Fibre-optic cable carries the laser light to transmitter heads, which direct the beam along a path to a reflector. The return light is collected on a photo-detector and the photo current is carried to the CCU via coaxial cable. The transmitter heads are intrinsically safe. One CCU can monitor up to 8 heads.

Both GasFinder and GasFinder MC employ visible aiming lasers making alignment easy and swift. The outgoing beam diverges and overfills the reflector, providing excellent tolerance to vibration and heating effects.



Operational Specifications

Detection Limit & Accuracy	0.1 ppm-m (HF)
Dynamic Range	4 orders of magnitude
Response Time	1 second (default) Programmable
Path Length	< 1m to >1000m
Light Source	Semiconductor diode laser
Eye Safety	Class I or Class IIIa (ANSI) FDA/CDRH approved
Data I/O Interface Options	RS-232, RS-485, Modbus 4-20mA current loop

Physical Specifications

GasFinder

Weight	5 kg
Dimensions (L x W x H)	26 x 20 x 16 cm
Power Requirements	2A @ 12 Vdc
Ambient Temperature	-30° C to +50° C
Hazardous Area Classification	North American Class 1, Div 2, Groups A,B,C,D

GasFinder MC

Central Control Unit	Weight	12 kg
	Dimensions (W x D x H)	44 x 38 x 13 cm
	Power requirement	<1A @ 110 Vac
	Ambient Temperature	0° C to 50° C
Open Path Transmitter	Weight	4 kg
	Dimensions (L x dia)	35 x 10 cm
	Ambient Temperature	-45° C to +80° C
	Ingress Protection	IP 65
Duct Transmitter Unit	Weight	2 kg
	Dimensions (L x dia)	25 x 12 cm
	Ambient Temperature	-45° C to +80° C
	Number channels/paths	Up to 8
	Maximum cable lengths	1000 m
	Hazardous Area Classification	Cl 1, Div 1, Groups A,B,C,D Cenelec Zone 1

Other Gases

Gas	Range (ppm-m)	Sensitivity (ppm-m)	Sensitivity (100m path) (ppm)
NH3	0 - 5,000	2	0.02 ppm
H2S	0 - 100,000	20	0.2 ppm
CO2	0 - 5,000,000	1000	10 ppm
CH4	0 - 5,000	1	0.01 ppm

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Three patented features provide laser gas detector leadership in price, performance, and ease of use.

- "No phase adjustment" detection technology:**
enables paths from 1m to 1000m without requiring any phase adjustments or calibration.
- Built-in, permanent calibration reference cell:**
means GasFinders are delivered calibrated, stay in calibration and never needs to be re-calibrated.
- Fibre-optic multiplexing:**
enables multiple path/point monitoring.

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August 2002

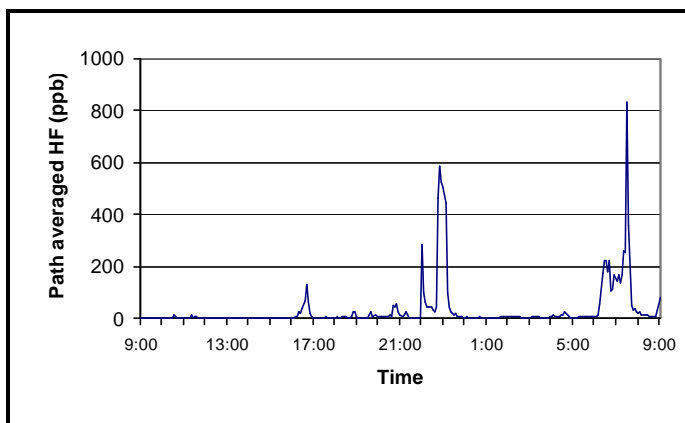
Safety Monitoring in HF Alkylation Units

HF Alkylation units in oil refineries use Hydrogen Fluoride (HF) as a catalyst in making high-octane gasoline. HF is a highly toxic gas, so refineries manage HF Alkylation units very carefully. However, there is always the risk of leaks from process elements such as valves, pump seals and storage vessels. Tanker unloading operations also provide the opportunity for HF releases.

Alkylation units typically have arrays of point sensors distributed throughout the unit. However, these sensors are maintenance intensive and have relatively slow response. In addition, a point sensor will not detect an HF release unless it is located directly in the path of that release. Electrochemical HF sensors also respond to chlorine (Cl_2), ammonia (NH_3) and sulfur dioxide (SO_2), resulting in false alarms.

GasFinder complements or replaces point sensor arrays by providing total perimeter coverage, with high sensitivity (1ppb on 100m path), fast response (1sec) and no false alarms. Built-in self calibration and self diagnostics add to user confidence. GasFinder systems are not affected by extreme weather conditions.

The portable GasFinder can be used for temporary monitoring during turnarounds and new construction and commissioning. For permanent installations, GasFinder MC is a robust, reliable and low maintenance system that provides the earliest possible warning of potentially dangerous releases of HF.



GasFinder monitoring HF emissions from an Alkylation unit over a 24-hour period during a turnaround

Benefits

Lowest Cost of Ownership

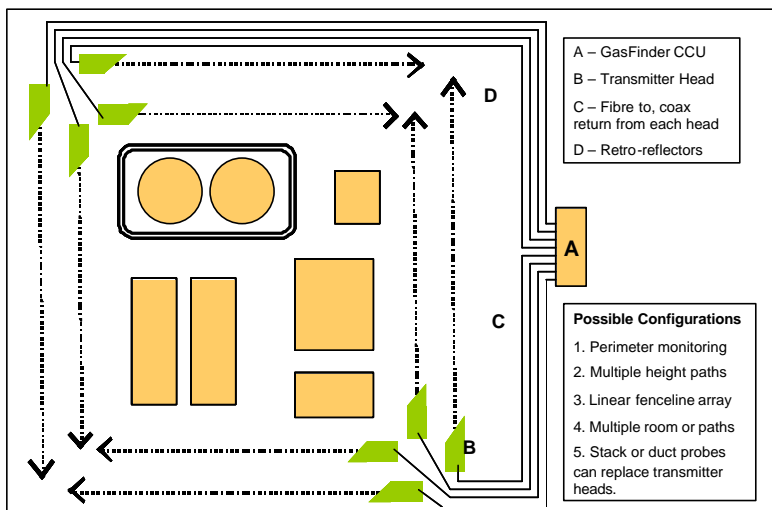
- Low engineering, installation and training costs
- No consumables and no maintenance

Better than point sensor arrays

- HF specific—no interference from Cl_2 and NH_3
- 1 second response, 1ppb accuracy over 100 m
- Detects over a large area, not just single points
- Reliable performance in cold weather

Better than other open path monitors

- Self-calibrating—no calibration needed
- Easy set-up and alignment
- Path lengths from 1 to 1000 m
- Portable operation possible with GasFinder
- Built-in data logger



GasFinder MC (shown above with an open path transmitter head) can be used in various configurations (left) for improved safety in Alkylation units and other HF related processes.