Application Bulletin

BOREAL LASER GasFinder

Complete HF monitoring solutions for Primary Aluminium Smelters

Aluminium smelting generates large amounts of hydrogen fluoride gas (HF). Worker safety and ambient air quality concerns require that HF be monitored at several locations in smelters.

Historically, a variety of methods have been used for HF monitoring. Cassette samplers and wet chemistry techniques, coupled with complex and expensive sampling manifolds have monitored roof-line and scrubber duct HF levels. In recent years, open path infrared detectors have been used in rooflines, and laser HF monitors have shown promise for both open path and duct monitoring.

Boreal's GasFinder is now displacing these methods by providing HF data that is more accurate, and with faster response times, in packages that are both simpler and less expensive. The portable GasFinder is very popular for HF emissions studies in pot rooms, ducts, stacks and at facility boundaries. Both GasFinder and the multi-channel GasFinderMC are well suited to permanent installations.

Boreal Laser is proud that GasFinder has developed an industry leading reputation for ease-of-use, reliability and support. GasFinders are now used in over 25 smelters in 10 countries worldwide.

GasFinder

Selected GasFinder users

Alcoa
Alcan
Aluminium Pechiney
Tomago Aluminium
VAW Capral
Comalco
Dubai Aluminium
Aluminium Delfzijl
Procedair
Ormet
Reynolds Metals
Eastalco

Why Laser Gas Detection?

- HF specific - no interference from other gases
- Fast response times – typically one second.
- Long path lengths possible – up to 1000m
- Wide dynamic range – 4 orders of magnitude
- Robust, reliable technology.

Why GasFinder?

Unique Patented Features

1. "No phase adjustment" detection technology

- Enables paths from 1m to 1000m without requiring any phase adjustments or calibration.
- Enables truly portable operation with less than 5 minute set-up time.

2. Built-in, permanent calibration reference cell

- Calibration traceable to NIST standards
- Means GasFinders are shipped calibrated, stay calibrated and never need to be re-calibrated.

3. Fibre-optic multiplexing

- Enables inexpensive multiple path or point monitoring using the GasFinderMC

Other Operational Benefits

- Low engineering, installation and training costs
- No consumables and no maintenance
- Easy set-up and alignment
- Built-in data logger and self-diagnostics
- Remote analysis options include fiber-optic, hard-wired or radio – over 10km possible

"Changing the way industry looks at gas sensing"

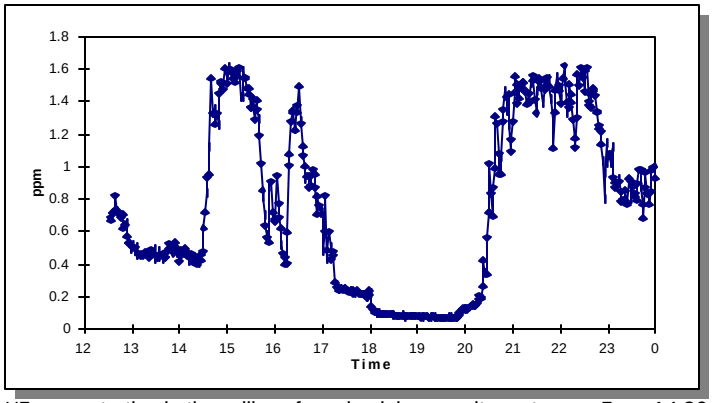
GasFinder

GasFinder Applications in Aluminium Smelters

- Continuous pot room roof monitoring
- Scrubber inlet monitoring
- Scrubber outlet monitoring (see below)
- Fume Treatment Plant (FTP) performance tests
- Process improvements to reduce HF emissions
- Fence line ambient HF monitoring
- Crane cab HF monitoring

Pot room & Fence line monitoring

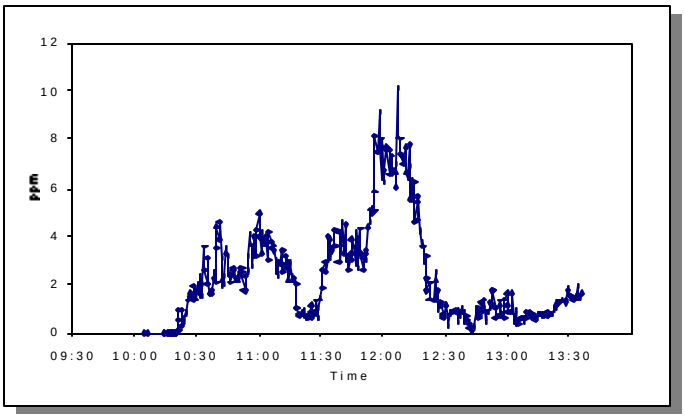
Pot room monitoring used to mean labour intensive cassette sampling along the length of a roof vent. Now, a GasFinder path may be set up below the roof vent, with data transmitted to a central computer, and reliable, accurate HF data are recorded continuously, with little or no maintenance. In four separate, detailed comparative studies with major aluminium manufacturers worldwide, GasFinder HF data agreed with standard cassette sampling data to within 5%.



HF concentration in the ceiling of an aluminium smelter pot room. From 14:20 to 16:35, anodes were being changed. A break at 16:00 is easily seen.

FTP Duct & Stack Monitoring

HF generated in the smelting process is collected and carried via ducts to scrubbers where the HF is removed. By measuring HF concentrations in the inlet and outlet ducts, GasFinder provides data on scrubber efficiency. By monitoring HF in outlet ducts and stacks, GasFinder can ensure that environmental standards are being met.



Here, GasFinder measures the HF in a 38cm duct at the outlet of an HF scrubber with an accuracy of about 0.2 ppm

Operational Specifications

Detection Limit and Accuracy	0.1 ppm-m
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	RS232, 9600 baud 4-20 mA 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	Cl 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
Duct Transmitter Unit	Weight	2 kg
	Dimensions (L x dia)	25 x 12 cm
	Ambient Temperature	-45°C to +80°C
Number of 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

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