

PRODUCT BROCHURE

# ATOM FGA-1000

Flare Gas Analyzer for Total Sulfur



**Fast**

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**Accurate**

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**Reliable**

## KEY FEATURES

- Single calibration range (0-100%)
- Unmatched speed of analysis and response time
- Low utility consumption
- Lowest cost of operation
- Most compact footprint
- Does not require installation in shelter

ATOM Instrument offers the most versatile Total Sulfur analyzers available. The ATOM FGA-1000 has the highest dynamic measurement range of any commercially available analyzer without the need for additional sample valves, calibration gases or system hardware. In addition, the ATOM FGA-1000 does not require installation in a shelter.

The ATOM FGA-1000 is an online process analyzer utilizing patented Excimer UV Fluorescence (EUVF) technology to measure Total Sulfur in a variety of applications such as monitoring refinery flare gas and subsequent sulfur dioxide (SO<sub>2</sub>) emissions as mandated by the EPA Rule 40 CFR 60, Subpart Ja.

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## Typical Applications for Excimer Technology

- Process Streams
- Flare Gas
- Stack Gas
- Refined Fuels
- LPG
- Natural Gas

## Features

### Excimer UV Fluorescence (EUVF) Unmatched Dynamic Range and Stability

The Model FGA-1000 with EUVF is a field proven technology utilizing an excitation wavelength that achieves unparalleled dynamic range and detector stability. The FGA-1000 is an excellent fit to cover the potential ranges (0-50% or higher) and harsh environments (outdoors installation) required by Ja.

### Design Simplifies Compliance with EPA Rule 40 CFR 60, Subpart Ja

The Model FGA-1000 provides complete TRS Data resulting in the total analysis of all sulfur compounds potentially present in flare gas streams. Not just the analysis of a few selected sulfur compounds as with some GC applications. Also, Certification or CGA (Cylinder Gas Audit) is seamlessly provided by the incorporated calibration switching configuration and corresponding software menus for easy compliance testing.

## Principle of Operation

One of the most simple and practical low-level sulfur analytical techniques that has been widely used and proven over many years of industrial utilization is the UV Fluorescence method (UVF). The UV Fluorescence method involves injection of a sample into a high-temperature oxidation or combustion furnace, which converts all hydrocarbons into water (H<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) byproducts. Total Sulfur content contained in any molecular-bound hydrocarbon species is similarly oxidized at temperatures in excess of 1000°C into sulfur dioxide (SO<sub>2</sub>) by the reaction:



The furnace effluent containing these combustion byproducts is directed into a detection chamber where it is excited by high-energy, short-wavelength emission from a UV excitation source. The UV photons from the excitation source or lamp, transfers energy into the SO<sub>2</sub> molecule and raises its energy level to create an excited singlet state. These excited molecules rapidly decay back to their lower energy ground state releasing the absorbed energy as a secondary emission known as fluorescence.



This low-level fluorescence emission is optically filtered to remove undesired wavelengths of the UV source and background scatter within the detector chamber. Detection of filtered fluorescence emission is accomplished using a Photomultiplier Tube (PMT) and amplified by proprietary high-sensitivity electronics.

The analyzer GUI (Graphic User Interface) control panel presents an organized set of intuitive operated menu screens. The home screen displays 3 user selectable digital bar graphs updated in real-time from the process. Run Cycle Status with current event is refreshed moment by moment. Major system control elements are on this home screen.

The calibrate screen allows complete control of the calibration and validation process including manual calibration and auto validation sequence. During calibration, inspect the peak area of each run.

Set screens, such as Timed Event Settings sets up the event timing of an analysis cycle.

View the status of system inputs and outputs. Software includes password security and plotting of real-time and historical data. The software is easy to use and there is a Full Context Help Package by pressing F1 on any screen.



## Single Calibration Range/Lowest Cost of Operation

The ATOM FGA-1000 allows a wider linear dynamic range of measurement than competing technologies. Analysis of Total Sulfur content is accomplished utilizing a single sample injection valve and single PMwT power supply, allowing a single-point calibration for the intended measurement range. This simplifies complexity and downtime required for instrument calibration, as well as reduces associated costs related to multiple calibration gases, regulators and gas switching components.

## Speed of Analysis and Response Time

The ATOM FGA-1000 is specifically designed for high speed analysis and a fast response time. This feature enables more rapid, real-time measurements to be performed allowing flare events and emissions to be more accurately monitored and quantified. Emission variations and detail, not apparent with slower responding analyzers, may either be revealed or become more apparent. Although a 100-seconds cycle

time is standard, the ATOM FGA timetable can be easily reconfigured for a cycle time as fast as 60-seconds, should the need for even higher speed be necessary or desired.

## Compact Footprint

The following table allows direct comparison for size and occupied volume of the ATOM FGA-1000 vs current standard instrument packages. (Dimensions do not include size of the mounting framework or stand).

	Package 1	Package 2	ATOM FGA
Height	45/56 inches (D1/D2)	45.00 inches	38.00 inches
Width	24.00 inches	26.00 inches	27/32 inches
Depth	18.00 inches	17.00 inches	12.75 inches
Volume	11.25/14 ft <sup>3</sup>	11.50 ft <sup>3</sup>	8.10 ft <sup>3</sup>

## Rugged Versatile Design

The ATOM FGA-1000 does not require installation in a shelter for standard operation. This provides for easy integration into an existing process and can greatly reduce overall capital cost.

## SPECIFICATIONS

### Analytical Performance

**Measurement Method:** Total Sulfur – Excimer UV Fluorescence (EUVF)

**Measurement Range:** 0-100% (as required for specific flare application)

**Repeatability:** 50 ppm SD or  $\pm 2\%$  of measured value, whichever is greater or 25 ppm SD with 5-min. averaging

**Linearity:**  $\pm 2\%$  of full scale (dynamic range dependent)

**Response Time:** 100 sec. to 99% of new value

**Calibration:** Automatic or manual

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### Analog/Discrete Data Communications

**Analog Outputs:** Two 4-20 mA DC

**Alarm Outputs:** One global dry contact triggered by one or more of the following:  
Power failure, loss of purge, low oxidizer pressure, autocal fault, analyzer in calibration, analyzer not running

**Digital Data Communications:** Channel 1: RS-232 Modbus (optionally available as RS-485 or ethernet)  
Channel 2: TCP/IP ethernet

**Local MMI (GUI):** 12" Touchscreen computer with embedded Windows 7 allows complete operation and control of all analyzer functions

**Remote Interface:** ATOM ACCESS allows complete control of SGA-1000, including monitoring of analysis parameters and digital data values

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### Utility Requirements

**Ambient Temperature:** -20°C to +40°C  
(-4°F to +104°F)

**Instrument Air:** 70 psig (4.8 bar), 7 SCFM,  
Oil Free, -40°C (-40°F)  
dew point

**Power:** 110 VAC, 50/60 Hz  
at 2200 watts

**Zero Grade Air:** 70 psig (4.8 bar), 200 SCCM

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### Physical Parameters

**Dimensions:** 965.2 mm (38.0 in) high x 660.4 mm (26.0 in) wide x 304.8 mm (12.0 in) deep

**Mounting:** Wall or Unistrut Stand

**Certifications:** Built to NEC Class 1, Div 2, Group B,C,D. CSA (optional)

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