

PRODUCT BROCHURE

ATOM SGA-1000

Fast, Multi-Stream Total Sulfur in Gas Analyzer



Precise

Consistent

**Reliable
Analysis**

KEY FEATURES

- Low Concentration Total Sulfur Analysis (<1 ppm)
- High Speed Analysis and Response Time
- User Defined Data Averaging
- Low Utility Consumption
- Convenient Compact Footprint
- Does not Require Installation in Shelter

ATOM Instrument offers the most versatile Total Sulfur analyzers available. The ATOM SGA-1000 has the fastest analysis time of any commercially available analyzer allowing user-defined, multiple cycle averaging to improve analyzer performance. The analyzer operating software is both intuitive and user-friendly. For most applications the ATOM SGA-1000 only

requires bottled air for normal operation and does not require installation in a shelter.

The ATOM SGA-1000 is an online process analyzer utilizing patented Excimer UV Fluorescence (EUVF) technology to measure Total Sulfur in a variety of refinery process applications.

Typical Applications for the SGA-1000 includes Total Sulfur measurement in:

- LPG
- Natural Gas
- Reforming and Isomerization
- Catalyst Protection
- Blending Operations
- Flare and Stack Gas
- Refinery Grade Fuels

Key Features

Excimer UV Fluorescence (EUVF) Provides Low Range Detection and Stability

The Model SGA-1000 with EUVF is a field proven technology that utilizes an excitation wavelength that achieves high detection sensitivity and detector stability. The SGA-1000 is an excellent fit for applications in the 0-100 ppm range and is exceptionally stable, even at concentrations less than 1 ppm. The SGA-1000 is designed for outdoor installation and use in harsh environments as may be required by the refining (LPG), Gas Processing (NGL) and Natural Gas industries.

Simplified Design Improves Certification and Process Monitoring

The SGA-1000 for total sulfur measurement provides complete analysis of all sulfur compounds potentially present in process gas streams and not just a few selected sulfur compounds as with some GC/TDL applications. Calibration and validation is seamlessly incorporated with an optional calibration switching configuration and associated software for easy compliance or verification 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 (H₂O) and carbon dioxide (CO₂) byproducts. Total sulfur content contained in any molecular-bound hydrocarbon species is similarly oxidized at temperatures in excess of 1000°C into sulfur dioxide (SO₂) by the reaction:

$$\text{R-SH} + \text{O}_2 \rightarrow \text{SO}_2 + \text{CO}_2 + \text{H}_2\text{O}$$

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 SO₂ 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 SGA-1000 software incorporates a user-friendly graphical user interface (GUI) designed to be both intuitive and easy to use. All aspects of analyzer operation are accessible from the Main toolbar utilizing drop down menu screens.

The home screen displays 3 user selectable digital readout and analog bar graphs updated in real-time from the analysis. Run Cycle Status and current timed events are refreshed moment by moment. Major system control elements are also incorporated in this home screen.

The calibrate menu allows complete control of the calibration and validation processes, including manual or auto calibration and validation sequencing. Analytical results acquired during calibration events may be inspected at any time prior to any subsequent calibration.

All other menu screens such as Timed Events, Detector, Analog Output, Digital I/O and System Alarm Settings, allow the user to easily monitor or make changes to all aspects of analyzer control and operation.

The GUI software also includes user setup and password security, as well as plotting of real-time analysis data and historical settings.



Remote ATOM ACCESS®

The Analyzer Central Communication Ethernet Server Software (ACCESS) allows an authorized user to access any ATOM analyzer on the facility network from an internal office or work station. After a successful secure login, the network will initiate communication to the selected instrument of choice. Once connected, the instrument can be operated and interfaced with just as if the user was standing directly in front of the instrument. Instead of utilizing the analyzer touch screen, the remote connection keyboard and mouse are used for all interface requirements.

Speed of Analysis and Response Time

The SGA-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 process events and changes to be more timely monitored and quantified. Process variations and detail potentially obscured with slower responding analyzers, may be revealed or become more apparent. Although the cycle time is completely user selectable, a 100-second cycle time is standard. However, the SGA-1000 can be easily reconfigured for a cycle time as fast as 60-seconds, should the need for higher speed analysis be necessary or desired.

Low Concentration Total Sulfur Analysis

The SGA-1000 allows stable and accurate analysis at both high and low sulfur concentrations below 1 ppm. Taking advantage of the standard 100 second analysis cycle time, any number of standard analysis up to 10 sequential results can be seamlessly averaged to provide a more consistent and reliable concentration measurement, allowing optimization of low range detection performance and analyzer response time depending on application requirements.

Compact Footprint

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

	Package 1	Package 2	ATOM SGA
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 ³	11.50 ft ³	8.10 ft ³

SPECIFICATIONS

Analytical Performance

Measurement Method: Total Sulfur – Excimer UV Fluorescence (EUVF)	
Measurement Range:	1 ppm – 100% (As required for specific gas application)
Repeatability:	100 ppb SD or $\pm 2\%$ of measured value, whichever is greater. 50 ppb SD with 5-min. averaging or $\pm 2\%$ of measured value, whichever is greater. 25 ppb SD with 15-min. averaging or $\pm 2\%$ of measured value, whichever is greater.
Linearity:	$\pm 2\%$ of full scale (dynamic range dependent)
Response Time:	99% (+) in one cycle (100 secs typical)
Calibration:	Automatic or manual

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:	RS-485 or RS-422 Modbus (RS-232 or TCP/IP ethernet optional)
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

Utility Requirements

Ambient Temperature:	-20°C to +40°C (-4°F to +104°F)	Instrument Air:	70 psig (4.8 bar), 5 SCFM, Oil Free, -40°C (-40°F) dew point
Power:	120 VAC, 50/60 Hz at 2200 watts	Zero Grade Air:	70 psig (4.8 bar), 200 SCCM

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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Process Insights' products and solutions deliver innovative and differentiated analysis and measurement solutions and technologies that add high value to our customers and protect the environment.

Our commitment is to deliver smart and affordable innovation that optimizes process, improves safety, and transforms our world.

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Equipamientos Analíticos S.A.
Roosevelt 2445 8° A
(1428) Capital Federal
Tel: 54 (11) 4788 8493 / 8494 / 8531
ventas@equipanaliticos.com.ar
www.equipanaliticos.com.ar

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