

HORIBA

Explore the future

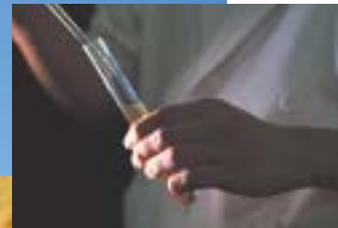
Fluorescent UV Sulfur Analyzers

SLFA-UV21A



Measurement of Low-concentration Sulfur in Gasoline and Light Oil Made Easier

The growing concern about air pollution is creating a far greater need than ever for accurate analytical technology, to prevent further pollution of the atmosphere. People's new awareness of the need for environmental protection, coupled with the strict regulations on sulfur content in light oil and gasoline, calls for an innovative analytical technique offering an extremely high degree of sensitivity and precision. HORIBA's latest technology, the Fluorescent UV Sulfur Analyzers SLFA-UV21A, is capable of quickly and accurately analyzing a wide range of sulfur content, from just 30 ppb (gasoline, etc.) to much higher concentrations (crude oil).



Fluorescent UV Sulfur Analyzers

SLFA-UV21A

Direct micro-syringe injection method

The direct micro-syringe injection is the optimum choice for highly volatile oils such as light oil and gasoline. The rotational mechanism of the micro-syringe allows the analyst to combine the high combustion efficiency horizontal furnace with the auto sampler.

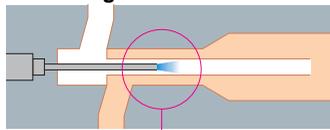
Auto sampler syringe cleaning mechanism

A special pump continuously flushes cleaning solution to efficiently and effectively clean the auto sampler syringe needle, both inside and out. In addition, the combustion tube is cleaned automatically to ensure that analysis is free of the impact of carry over, even immediately after testing a high-concentration sample.

Needle cleaning mechanism



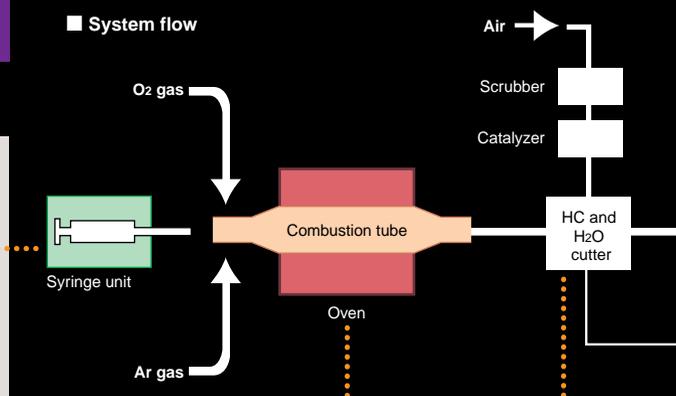
Combustion tube cleaning mechanism



To clean the combustion tube bore, water is injected closer to the entrance than the sample injection, so that even trace amounts of the previous sample are completely washed away.



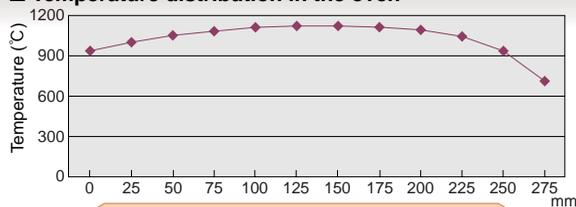
Inside the auto sampler



Horizontal oven offers higher combustion efficiency

The syringe injection port is maintained at high temperature to ensure complete vaporization of samples with a high boiling point. The horizontal oven supports a wide combustion range, producing a more even temperature distribution than vertical-type ovens, and ensuring complete combustion of all sample.

Temperature distribution in the oven



The Fluorescent UV Sulfur Analyzers SLFA-UV21A feature a horizontal oven with a longer ignition. The point of the syringe needle inserted in the combustion tube is kept at high temperature to allow perfect vaporization of the sample. This design prevents incomplete combustion of the sample and ensures highly stable measurement while reducing the frequency of combustion tube cleaning.

Excellent repeatability

- Sulfur concentration 15 ppm ▶ σ_{n-1} : 0.2 ppm(CV1.3%)
Sample repeatability
- Sulfur concentration 30 ppm ▶ σ_{n-1} : 0.5 ppm(CV1.6%)
Sample repeatability

Typical analytical result

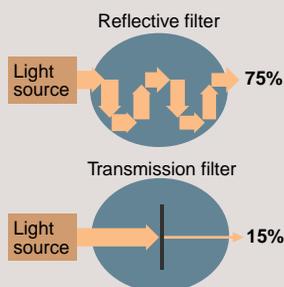
Gasoline		Gasoline		Kerosene oil (50 ppm)		Light oil (105 ppm)	
Sulfur(ppm(m/m))		Sulfur(ppm(m/m))		Sulfur(ppm(m/m))		Sulfur(ppm(m/m))	
	15.00		5.035		51.07		105.56
	15.07		4.999		49.89		104.71
	14.90		5.005		49.40		104.10
	14.99		5.062		49.33		105.68
	15.12		5.031		50.52		104.71
Mean	15.02	Mean	5.026	Mean	50.04	Mean	104.95
Standard deviation	0.084	Standard deviation	0.025	Standard deviation	0.75	Standard deviation	0.66

Reflective filter for high-sensitivity analysis

The analyzer has a high-sensitivity UV detector with proven performance at 0.05 ppb (V/V) as an atmospheric SO₂ monitor. Eight spectral mirrors are combined to change the excitation light to a monochromatic beam to minimize the interference due to moisture and other factors. The reflective filter provides sensitivity about five times greater than a transmission filter (comparison with HORIBA's other products).

Reflective filters vs. transmission filters

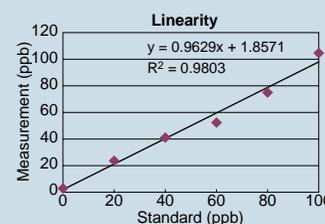
The reflective filter uses eight reflective mirrors, each with central wavelength reflectivity of 95% or higher, for wavelength selection of the excitation light. This provides increased excitation energy and 250 nm or higher wavelength filtering, normally unachievable with transmission filters.



Linearity at super-low concentration level (SLFA-UV21A)

Sample: Dibenzothiophene diluted with toluene
Amount: 20 μL
Injection rate: 1 μL/s

	Blank	20 ppb	40 ppb	60 ppb	80 ppb	100 ppb
1	7	24	36	56	67	110
2	3	28	49	56	82	102
3	0	20	39	45	77	102
Mean	3	24	41	52	75	105



Measurement conditions are preset in the dedicated sulfur analyzer

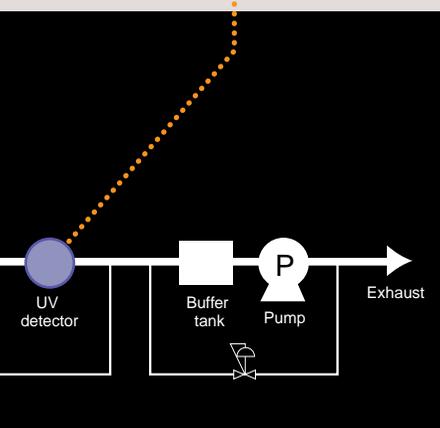
User-friendly Design

The analyzer is delivered with the oven temperature settings and gas flow-rates pre-optimized to ensure efficient analysis of the sulfur contents. In addition, the use of the very sensitive SO₂ analyzer keeps the detection sensitivity extremely stable. The analyst can begin working without making any adjustments at all. For special cases, the injection rate and a few other parameters need to be selected according to the sample type and concentration, before starting the analysis. The analyzer is protected by an interlock mechanism against low oven temperatures, oxygen supply failure and low flow rates due to equipment malfunction. This eliminates the risk of incomplete combustion during analysis.

Moisture and HC removal by a transmission membrane

Easier Maintenance

Moisture and trace unburned HC are removed by a transmission tube (HC and H₂O cutter) to eliminate interfering elements from the fluorescent chamber. This removal interference makes maintenance work much easier.



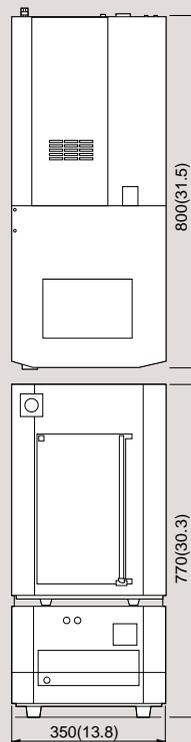
Specifications

Principle	Combustion and fluorescent UV analysis
Sample	Gasoline, kerosene oil, light oil, heavy oil, etc. (viscosity under 20 mm ² /s)
Target	Sulfur
Range	0% to 1% (m/m)
Detection limit	30 ppb (toluene measurement 3 σ)
Accuracy	Standard deviation \leq 0.2 ppm (at 15 ppm) Standard deviation \leq 0.5 ppm (at 30 ppm)
Sample requirement	5 μ L to 20 μ L
Measurement time	Approx. 1 to 5 minutes from the start of sample injection
Displays	Analytical results, alarms and graphs displayed on LCD and printouts
Sample name	Up to 20 single-byte characters
Sample preset	Up to 200 samples
Function	Cleaning: Cleaning and combustion tube washing (remove) Interrupt: Editable sequence of measurement Self-diagnosis: Alarm display, maintenance counter Memory: Measured values automatically saved Graph data: Extraction curves automatically saved Statistics: Means, standard deviations, CV, graphics Option: Automatic input of density from the optional density meter
Control PC	PC and Windows compatible
Gas supply	Oxygen 95.5% or higher Argon 99.99%
Gas consumption	Oxygen: 700 mL/min, Argon: 100 mL/min
Power	100/120V, 200/220/240V AC \pm 10%, 50/60Hz Approx. 1.5 kVA (When powered at AC 100V, an AC 100/120V step-up transformer is used.)
Operating temperature	15°C to 35°C (performance guaranteed)
Auto sampler	Type: X, Y, Z, R drive (horizontal oven) with syringe cleaning function Sample: Up to 42 samples
Mass	70kg (combustion unit 40 kg, detector unit 30 kg)
Option	Density meter

* The SLFA-UV21/UV21A confirms to the following standard; ASTM D5453 (USA)

Dimensional Outlines

Unit: mm(in)



Sulfur analyzer SLFA series



High-sensitivity,
high-precision type

Fluorescent X-ray
sulfur analyzer
SLFA-2800/2100



Compact,
lightweight type

Fluorescent X-ray
sulfur analyzer
SLFA-20

Horiba continues contributing to the preservation of the global environment through analysis and measuring technology.



Please read the operation manual before using this product to assure safe and proper handling of the product.

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