

T L G - 8 3 7
AN IN - SITU TAIL GAS ANALYZER

No MOVING PARTS
No MOVING SAMPLE



Applied Analytics, Inc. design adheres to the principle of no moving parts no moving sample in sulfur recovery applications. The TLG-837 uses solid state diode array spectrophotometer for detection, measuring complete spectrum from 190nm to 1100nm with 1nm resolution. It can readily be used for absorbance measurements of up to 2AU \pm 0.0002AU. Allowing for a very wide concentration dynamic range and accurate measurements. The light source is a pulsed xenon with extremely long life time or a very low noise deuterium source. The TLG-837 uses fiber optics to transmit light to and from the detector allowing the electronics to be physically separated from the probe. A patent pending demister probe - "cold finger probe" is used for in-situ measurements. The new design is simple and requires very low maintenance, benefiting from the availability of the state of the art detectors, fast computers and the innovative yet simple "cold-finger" probe, for instantaneous data analysis.

The detector: A high resolution UV/VIS diode array detector. The photodiode array has a broad

spectral response and high sensitivity in the ultraviolet range. The low dark current and large charge saturation enables signals to be obtained with a high signal to noise ratio. The detector's aperture match the fiber optics numerical aperture, hence, maximizing the light throughput.

The light source: Either a very long life pulsed xenon lamp or a low noise Deuterium lamp. The light is focused onto the tip of a fiber optics via collection optics and not direct couple for maximum light throughput.

The probe: the probe is constructed from three concentric tubes. The outer one is 1.5" in diameter and is the outside diameter of the probe. The inner one is basically a "cold finger" that is designed to remove most of the sulfur vapor in a controlled manner. A tube is leading to the bottom of the cold finger and bringing air from the top of the probe to the bottom of the cold finger in order to cool it. The head of the probe contains an air driven aspirator that provides the motive force for the sample to travel through the probe past the cold finger where the sulfur is removed and into the integrated flow cell through the integrated aspirator and out into the process through the waste tube.

FEATURES:

Diode array detection

Solid state no moving parts

Wide wavelength range

High resolution

Accurate concentration readings

No maintenance

In situ detection cold finger demister probe

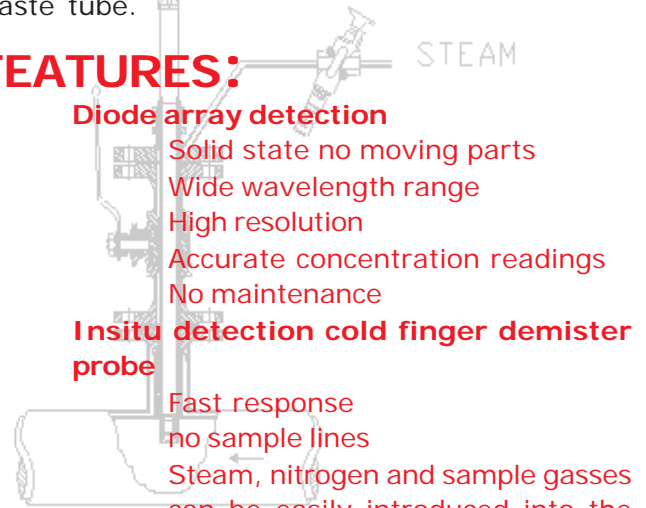
Fast response

no sample lines

Steam, nitrogen and sample gasses can be easily introduced into the probe

Fiber optics

Low Noise / long life source





Absorbance spectra:

The analyzer measures a complete spectrum of the process and analyze the data via a calibration method to give very accurate and reliable concentration readings. In addition standard gases can be introduced at any time to test the accuracy and reproducibility of the analyzer. In the continuous operation the complete spectrum is displayed, allowing the operator to check the system and the validity of the actual reading, as oppose to filter based units where the operator has no access to the actual raw spectra only to the final numbers.

Figure 1: Absorbance spectra of H₂S 0.25 - 1.25%

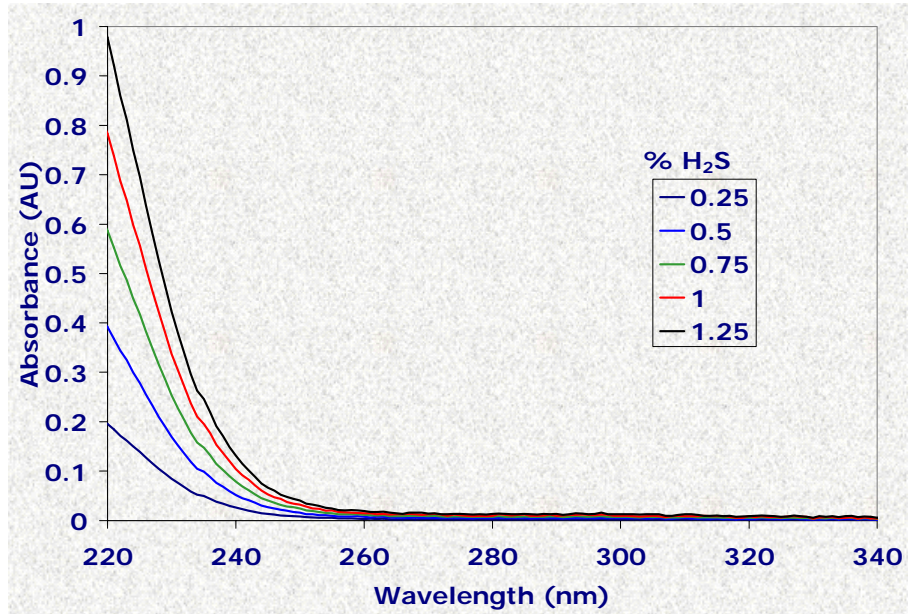


Figure 2: Absorbance spectra of SO₂ 0.25 - 1.25%

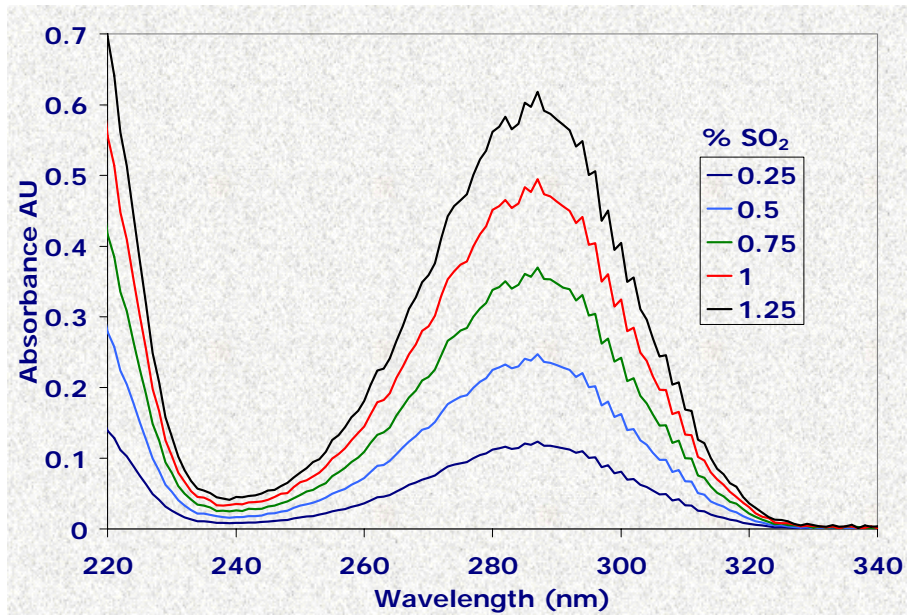


Figure 3: Absorbance spectra of COS and CS₂

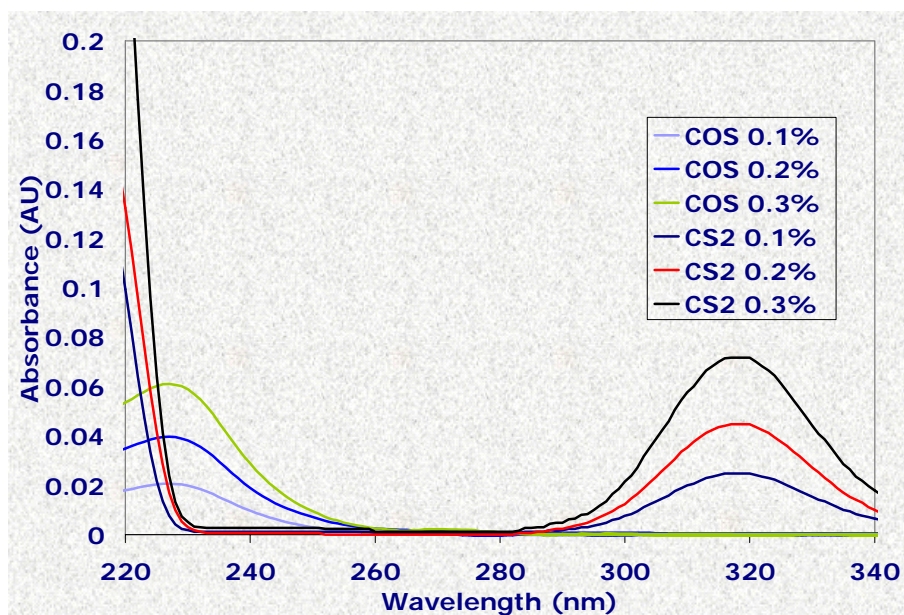
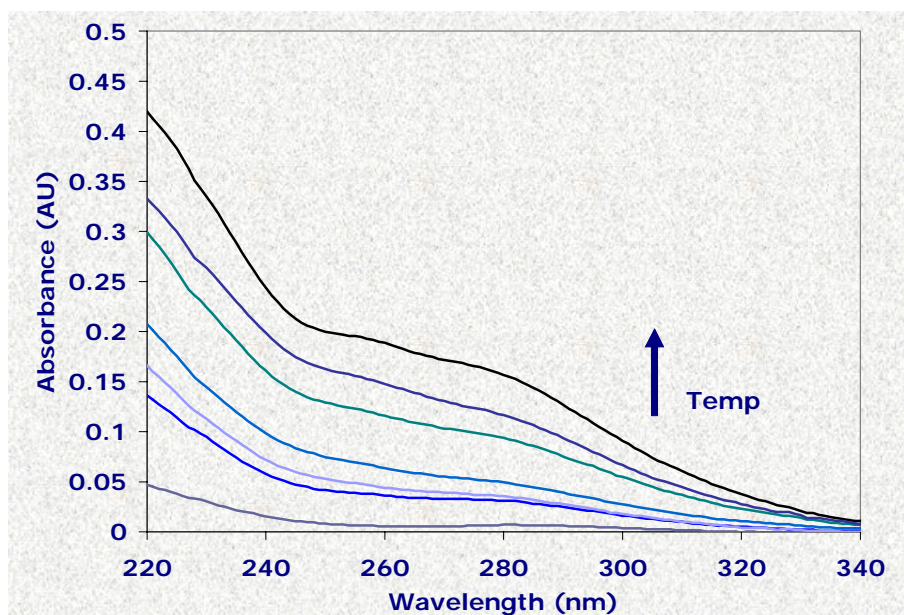


Figure 4: Absorbance spectra of Sulfur vapor at various temperature.

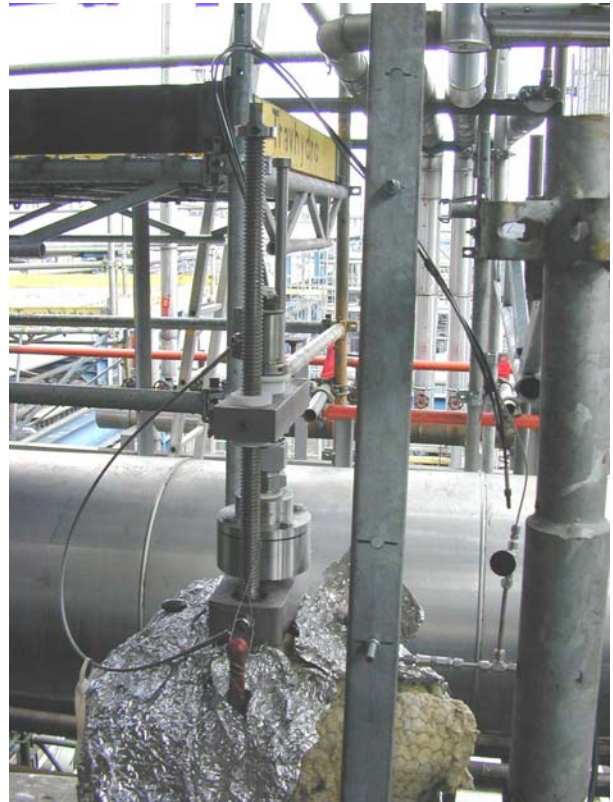


The sampling:

The tail gas stream, depending on the source, contain various amounts of sulfur. In order for the TLG-837 to be applicable to any condition a patent-pending demister probe was design. The measurements are being performed insitu while the sulfur is reduced significantly by this 'cold-finger' probe, no coating or plugging usually associated with sulfur streams are seen.

The probe is constructed from three concentric tubes. The outer one is 1.5" in diameter and is the outside diameter of the probe. The inner one is basically a "cold finger" that is designed to remove most of the sulfur vapor in a controlled manner. A tube is leading to the bottom of the cold finger and bringing air from the top of the probe to the bottom of the cold finger in order to cool it. The head of the probe contains an air driven aspirator that provides the motive force for the sample to travel through the probe past the cold finger where the sulfur is removed and into the integrated flow cell through the integrated aspirator and out into the process through the waste tube.

Installed Insitu probe



Complete probe



Probe + fibers



Assembling/ disassembling the probe.



SPECIFICATION

Measurement method	Diode array 190-1100 nm	
Components	H ₂ S	0-2%
	SO ₂	0-2%
	COS	0-2,000ppm
	CS ₂	0-2,000ppm
Accuracy	±1% of measurement on all components, (±5% below 500 ppm for COS and CS ₂)	±0.2% on air demand
Repeatability	±0.4% of measurement for H ₂ S and SO ₂	±0.1% for air demand.
Zero drift	Air demand: +/- 0.1 after 1-hour warm up, measured over 24 hours, every 5 seconds, constant ambient temp.	
Response time	90% of final value in 10 sec.	
Calibration	Factory calibrated, verification and validation with standard gas samples and neutral density filters.	
Outputs	4-20mA and RS232 for air demand, H ₂ S, SO ₂ , COS, CS ₂ and sulfur vapor.	
Power consumption	300 watt	
Electrical requirements	80 to 240 VAC 47 to 63 Hz	
Area Classification	Class1, Groups C & D, Div. II / Zone 1 II B T3	
Ambient temperature	-20 to 50° C (0-120°F)	
Instrument Air	min 4.5 bar (-40 C dew point)	
Steam pressure	min 4.5 bar	
Physical dimensions (not including probe)		
Size	30" H x 24" W x 11" D (762mm H x 610mm W x 280mm D)	
Weight	164 lbs (74 Kg)	

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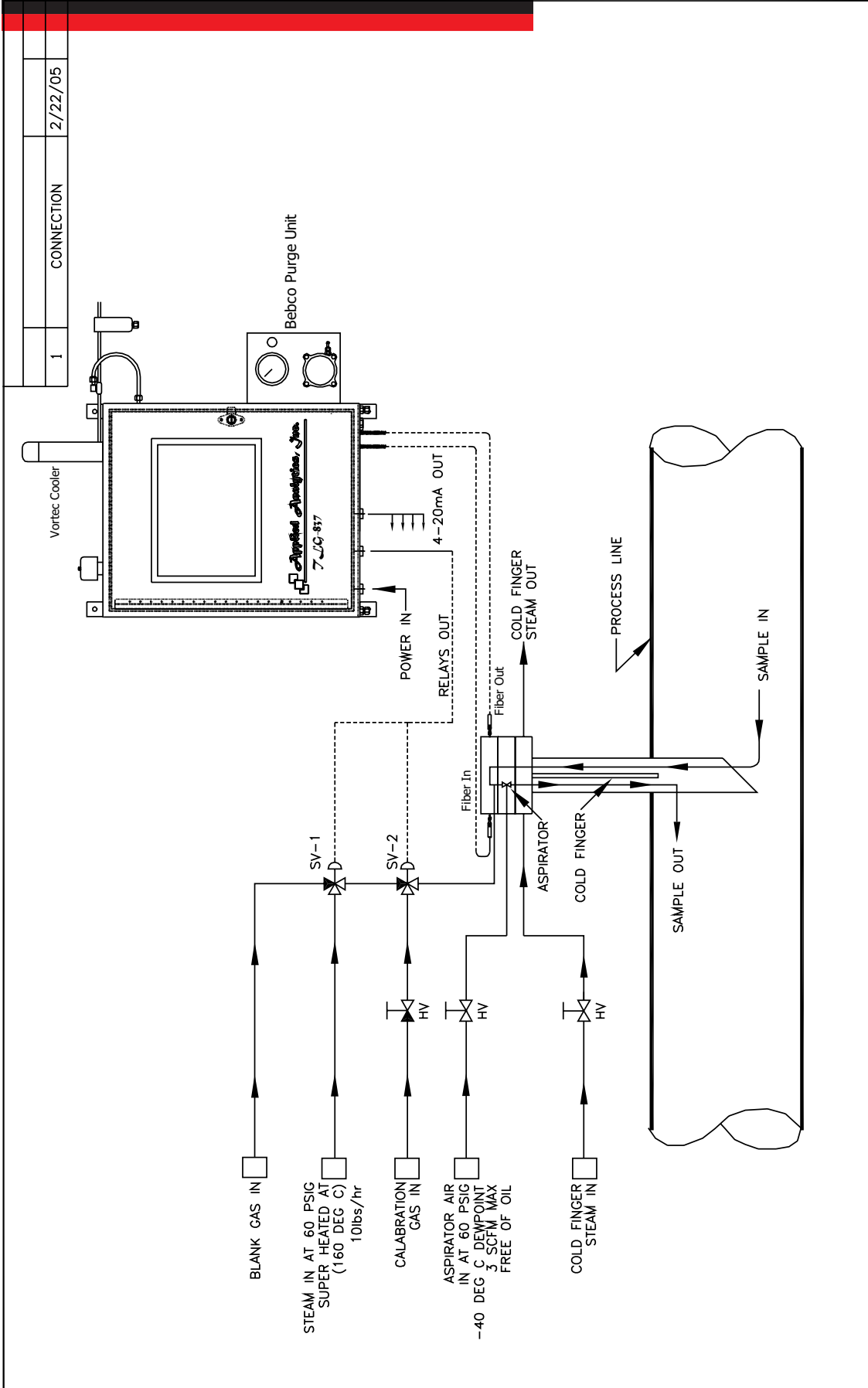
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Applied Analytics, Inc.



1	CONNECTION	2/22/05
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Applied Analytical Systems	
AJR	2/22/05
	None
	YB
TLG-837 Connections	
	0837-540-65
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NOTES: UNLESS OTHERWISE SPECIFIED.
 1. INDICATES DIRECTION OF FLOW.
 2. INDICATES USER CONNECTION

