

Measuring H₂S in a Sulfur Pit/SRU

Applied Analytics Application Note No. AN-049

Application Summary

Analytes: **H₂S (hydrogen sulfide)**

Detector: **TLG-837-SP**

Process Stream: **Sulfur Pit**

Typical Measurement Range: **0-4%**

Introduction

A sulfur recovery unit (SRU) serves to remove H₂S (and other sulfur-containing compounds) from incoming acid gas and convert it into elemental sulfur. A Claus process is the most common method used for an SRU. Sulfur that is removed during the Claus process is condensed and directed into a sulfur storage pit. The liquid elemental sulfur that is produced in the Claus process can contain upwards of 300 ppmw of dissolved H₂S.

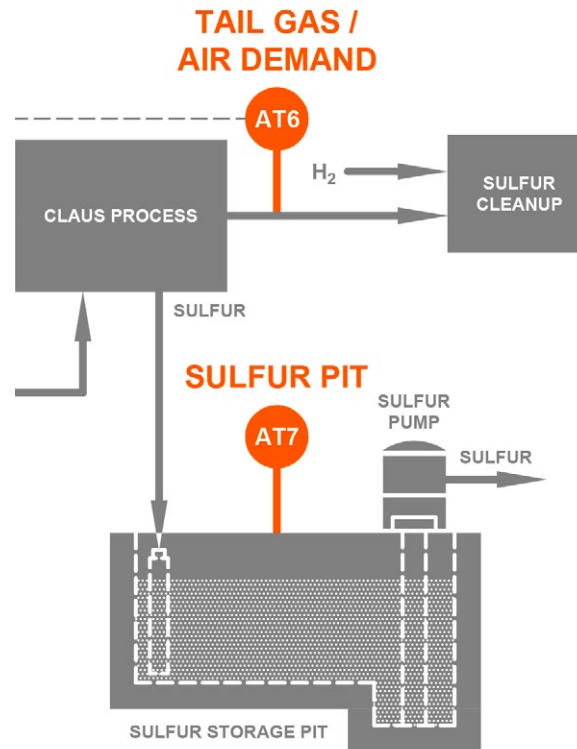
Over time, the dissolved H₂S will off-gas into the headspace of the sulfur storage pit, creating an equilibrium between the gas and the liquid. The H₂S that accumulates in the sulfur storage pit must be monitored. H₂S has a lower explosive limit of 4% by volume and can ignite when in contact with mechanical equipment such as pumps or compressors.

The TLG-837-SP Analyzer and Applied Analytics DEMISTER Probe can be used to monitor the level of H₂S that accumulates in the headspace of the sulfur pit. The DEMISTER Probe is inserted into a flange on top of the sulfur pit and continuously cycles sample gas. Ultraviolet light from the spectrometer inside the TLG-837-SP Analyzer travels to the head of the probe through a fiber optic cable where it interacts with the sample before being returned to the analyzer via a second fiber optic cable. The light being returned to the analyzer is then analyzed via the ultraviolet absorbance measurement technique and an H₂S reading is displayed.

No sample is removed from the probe and brought into the TLG-837-SP Analyzer enclosure. This ensures that there is no risk of sample leaking inside of the analyzer enclosure, which minimizes the risk to plant operators. The DEMISTER Probe conditions the gas sample to remove any trace elemental sulfur vapor which may plug up the probe. This feature minimizes the required maintenance of the probe.

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General Diagram of a Sulfur Recovery Unit (Claus Process) and a Sulfur Storage Pit

System Benefits: TLG-837-SP Process Analyzer

- » Continuously measures H₂S levels using UV-Vis spectrophotometer
- » Totally solid-state build with no moving parts — modern design for low maintenance
- » Additional software benches for up to 4 chemical analytes
- » Ultra-safe fiber optic design with no sample gas inside analyzer unit — world's safest solution for this application

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Further Reading

Subject	Location
TLG-837 Tail Gas Analyzer Unit Data Sheet	https://aai.solutions/documents/AA_DS004A_TLG837.pdf
TLG-837 Demister Probe Data Sheet	https://aai.solutions/documents/AA_DS004B_TLG837_Probe.pdf
TLG-837 Utility Control Panel Data Sheet	https://aai.solutions/documents/AA_DS004C_TLG837_UCP.pdf
Multi-Component Analysis Technical Note	https://aai.solutions/documents/AA_TN-203_MultiComponentAnalysis.pdf



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