



APPLICATION NOTE

TAIL GAS TREATING

H₂ Monitoring During Sulfur Recovery

IMPROVE TAIL GAS PROCESS CONTROL USING REAL TIME HYDROGEN MONITORING

Measuring excess hydrogen with H2scan inline analyzers helps plants:

- Protect the amine from SO₂ breakthrough
- Ensure the complete reduction of sulfur products
- Reduce the consumption of fuel or plant H₂
- Eliminate redundant or inaccurate analyzers

Measuring the hydrogen content in the gas exiting the reactor and quench tower is widely recognized as the primary way to ensure stable operation of the tail gas treating process. A second measurement location after the absorber is typically used to monitor the amine treatment section. The sample stream usually consists of approximately 3% H₂ and 1 – 3% H₂S, with ~10% CO₂, ~10% water vapor, and the balance consisting of N₂ plus various hydrocarbons and other compounds.



It has long been standard practice to use analyzers like thermal conductivity devices (TCD) or gas chromatographs (GC) to measure the hydrogen, but these suffer from known limitations compared to the accurate, real time, continuous measurements available from the H2scan solid state sensors.

In particular, because the contents of the tail gas stream can vary, operators using a TCD must inherently use a wide accuracy band, resulting in the use of too much hydrogen throughout the process. To compensate for this, multiple pH meters are also typically used, adding to the complexity and expense.

Similarly, the long response time, complexity and maintenance requirements, and cost (both upfront and ongoing) make the GC an unappealing option.

Using an H2scan inline process monitor combines the value and measurement speed of a TCD with the accuracy of a GC. The use of two relatively inexpensive analyzers in the tail gas treating unit helps optimize the sulfur recovery process, ensuring that the amine treater is protected from a costly and potentially damaging SO₂ breakthrough.

H2scan's **HY-OPTIMA™ 2740** hydrogen specific analyzers measure hydrogen in complex, varying gas streams. The H2scan solid state, non-consumable sensor technology provides real time continuous hydrogen concentration data with no cross-sensitivity to any other gases in the stream, including H₂S. No reference or carrier gas systems are required to reliably and accurately report real time hydrogen measurements with fast response times. For more info please visit www.h2scan.com.