

Unlocking efficiency and sulfuric acid plant optimization

TOPGUN: Not just a catalyst check,
but rather a full plant health check



Operating conditions, catalyst activity and equipment like heat exchangers and the converters impact sulfuric acid plant performance.

Unfortunately, conventional approaches to tracking leaks and diagnosing catalyst activity are often complicated and not always accurate.

TOPGUN gas analysis

Topsoe has a solution: the Portable Gas Analysis Unit (TOPGUN).

It enables you to troubleshoot, diagnose and optimize plant performance more quickly and effectively than ever before. It also provides the critical data operations needs to plan turn-arounds.

TOPGUN is a portable gas analysis unit for SO_2 and O_2 analyses. This is used as input to Topsoe's proprietary simulation program to accurately simulate converter performance.

There is no need for gas calibration on site and gas samples are taken with highly accurate Topsoe sampling equipment.

TOPGUN service

TOPGUN service enables greater asset reliability and enhanced efficiency for your operations, backed by an expert engineering team. We will work with you by ensuring the reliability of the unit, selecting the right sample points and providing hands-on support during sampling.

You need to get the most out of your assets to meet production KPIs while lowering operating expenses. Our TOPGUN service will work with you to accomplish that goal.

TOPGUN service simultaneously measures SO_2 and O_2 from the inlet and the outlet of the catalyst beds and all heat exchangers. Actual and historical operating data and information during catalyst loading are also collected.

Topsoe's simulation program uses the acquired data to give you an accurate and reliable view of current plant performance. The program yields valuable information for catalyst management and turn-arounds, as well as developing strategies to reduce SO_2 emissions or increase capacity. Operations will also be able to:

- Identify gas leaks and by-passes
- Get a real-time status of catalyst bed activity

It only takes 1 - 2 days to conduct a full 4-bed converter and heat-exchanger system sampling and analysis in plants running at steady-state conditions.

The Topsoe engineering team will prepare a complete report that includes all gas analyses, together with our findings, conclusions, and recommendations, after the visit.

Case

The challenge

A 3+1 double-absorption sulfuric acid plant for treating off-gas from a metallurgical unit had been forced to reduce production due to an operating event that increased SO_2 emissions, even though a tail-gas scrubber unit was in operation.

Solution

Topsoe's TOPGUN service analyzed the catalyst and plant performance before a planned turnaround. It showed that:

- The SO_2 concentration at the outlet last pass was 1500 ppm, corresponding to an overall conversion rate of only 98.8%
- Feed gas was leaking into the second pass

- Catalyst activity was low in the second pass
- Both heat exchangers for reheating gas from the IAT to the inlet of the fourth pass were leaking
- The fourth pass was operating sub-optimally due to equilibrium constraints, occurring as a result of a high inlet temperature and SO_3 entering the last pass

Outcomes

The TOPGUN findings were used to plan the plant's reconditioning. Catalysts in the first and second passes were partially replaced with 12 mm Daisy shaped VK38 catalysts as well. The results:

- SO_2 emissions returned to normal levels
- First and second pass catalyst performance improved significantly
- The stack SO_3 plume disappeared
- The tail gas scrubber unit was taken out of operation thanks to improved converter performance

The plant realized a significant cost reduction in tail gas unit operations, and its acid production rate was boosted by 5%.



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