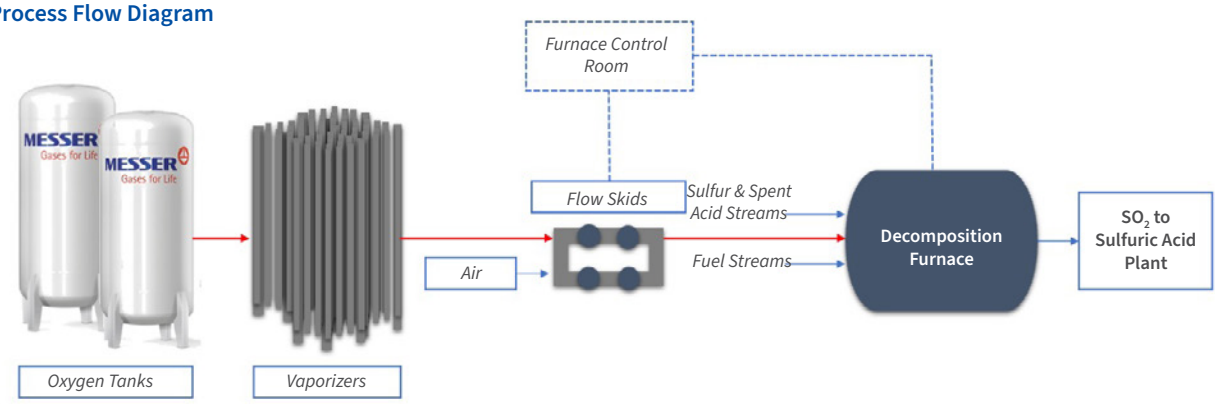
Furnace Optimization for Sulfuric Acid Regeneration (SAR)

Improve production and lower emissions with SAR+®

SAR+ Process Flow Diagram



Messer is the world's largest privately-held industrial gases company, with unrivaled technical development capabilities and agility from people you know and trust. Messer grows and innovates with our chemical and energy customers by providing gases and application technologies that boost throughput and lower their carbon footprint.

Background

As the world's most widely used industrial chemical, sulfuric acid (H_2SO_4) is used as a catalyst or as a dehydrating agent in refining, agricultural, metals and electronics processes. As environmental pressures increase along with demand for the multipurpose chemical, the industry is challenged to not only increase throughput from their existing Sulfuric Acid Regeneration process, but also to lower emissions.

The Next Generation in SAR

In SAR, less concentrated, or spent, sulfuric acid is reclaimed or regenerated back to high quality, high strength sulfuric acid by oxidation of the spent acid in a furnace followed by a sequence of cleaning and separation steps. Messer's patent-pending SAR+ solution enriches air with oxygen in the decomposition furnace in a specialized way to 1) increase productivity, 2) improve acid quality, and 3) reduce furnace emissions.

SAR+ Benefits:

- Process up to 50% more spent acid
- Increase pure sulfuric acid production up to ~10%
- Increase operational flexibility
- Decrease NOx emissions by up to 20% with increasing production rates
- Quick payback on investment – months, not years.

Boost the Throughput of Your Existing Furnace

Messer's SAR+ technology can be applied to your existing furnace. The SAR+ system includes the oxygen product supply, flow control skid and oxygen injection equipment designed and installed by our experienced team. Messer will analyze your furnace and current operating parameters by modeling your process to determine the optimum way to apply our oxygen. This proven oxygen dispersion technology easily integrates into your current process control system. The use of oxygen is controlled by furnace input streams and profitability targets.

Speak to our team today to learn how to boost throughput on your existing SAR process with SAR+.

Actual SAR+ Production Results

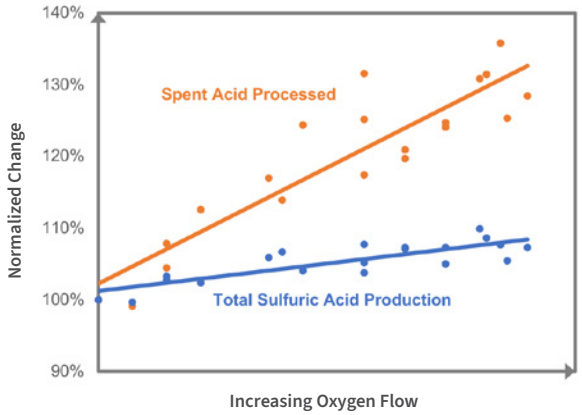


Figure 1: As oxygen flow rises, more spent acid can be processed achieving up to 20% more total acid production.

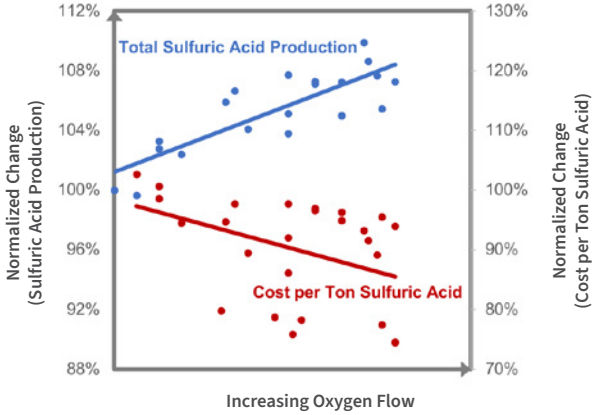


Figure 2: As spent acid consumption and acid production increase, the overall cost per ton of acid decreased with increased oxygen flow rate. Note: This figure includes additional test data when elemental sulfur was turned off.

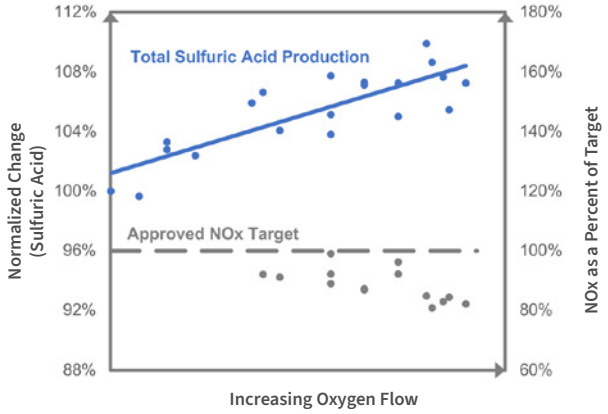


Figure 3: With increased acid production, NOx emissions remained below approved NOx targets and well below regulatory limits.

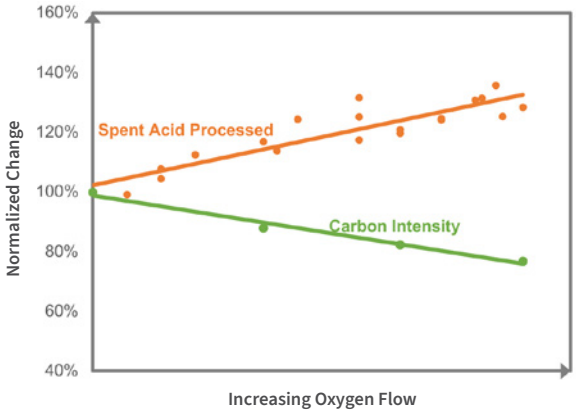


Figure 4: The additional spent acid flow rate and oxygen consumption reduces the carbon intensity (defined as the amount of heat input into the furnace per gallon of spent acid processed).

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