

MECS[®] SPENT ACID REGENERATION TECHNOLOGY

EFFECTIVE, RELIABLE, PROVEN

CHOOSING THE RIGHT SULFURIC ACID REGENERATION TECHNOLOGY

The growing use of sulfuric acid alkylation by refineries and increased production of spent sulfuric acid by chemical plants necessitates a resource to process the additional spent acid being produced. For many companies, consistently dependable regeneration technology is critical to meeting capacity requirements and fulfilling end market demands.

MECS[®] Dry Gas SAR technology offers sulfuric acid producers a highly effective solution that supports the production of very high quality alkylate, while ensuring consistent uptime with limited maintenance requirements. For refiners, petrochemical companies, and sulfuric acid companies producing or processing alkylation spent acid, MECS[®] Dry Gas SAR is the technology of choice.

While MECS[®] Dry Gas SAR technology is the industry leading technology in both alkylation and petrochemical spent acid applications, wet sulfuric acid regeneration has been proposed and offered with limited success for regenerating alkylation spent acid. DuPont Clean Technologies offers both MECS[®] Dry Gas and MECS[®] Wet Gas (SULFOX[™]) sulfuric acid regeneration technologies, however the wet gas sulfuric acid process for spent acid regeneration applications is NOT recommended nor is it offered from DuPont for these applications due lack of reliability.

Although wet gas regeneration technology has been used in certain geographies, the technical shortfalls of wet sulfuric acid have negatively impacted on-stream time and limited capacity of upstream units.

WE DELIVER TECHNOLOGY THAT WORKS.

MECS[®]
SULFURIC ACID

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MECS® SULFURIC ACID REGENERATION DESIGN BENEFITS

Equipment design has a critical effect on performance. With many decades of experience in process design and engineering services for more than 1000 plants in the global sulfuric acid industry, the MECS® technology is designed to match the needs of its users. That is why our MECS® Dry Gas SAR technology includes a number of unique features setting it apart from other commonly available regenerative solutions. The first and foremost technology selection criteria for refiners and petrochemical producers are reliability and on-stream time. The spent acid regeneration unit is a utility and service provider to upstream alkylation, acrylonitrile or methyl methacrylate units. When we design our unit for your site we do so with the mentality that the SAR unit must always be available and reliable. MECS® plant designs therefore balance operating temperature, acid concentrations, and corrosion rates to ensure consistent, productive uptime of the equipment while guaranteeing environmental compliance and offering proven protection of plant equipment from acid condensation.

RELIABILITY AND LOW OPERATING COSTS

To safeguard reliability and low operating costs, the MECS® Dry Gas SAR Technology focuses on delivering six important design aspects:

1. Furnace/Boiler Reliability
2. Gas Cleaning System
3. Weak Acid Mist and Particulate Removal
4. Sulfuric Acid Mist Removal
5. Product Acid Concentration
6. MECS® SolvR® Regenerative SO₂ Scrubbing

The tables below compare the performance of MECS® Dry Gas SAR and Wet Gas Sulfuric Acid Regeneration.

| ACID CONCENTRATION | |
|---|---|
| MECS® DRY GAS SAR TECHNOLOGY | WET GAS SULFURIC ACID TECHNOLOGY |
| 99.2wt% H ₂ SO ₄ <i>Guaranteed for all process conditions</i> | 96.5wt%-98wt% <i>Dependent upon process condition</i> |
| Design Factors: MECS® Dry Gas Technology is designed with process gas cooling to condense excess water in the process gas. This enables the production of high acid concentrations. | Design Factors: Wet Gas Sulfuric Acid Technology does not actively control water ingress during the process. Water ingress is a function of ambient conditions and combustion products. This results in lower, as well as fluctuating, acid concentration |
| Impact: <ul style="list-style-type: none"> • Lower acid consumption (-15%) • High concentration H₂SO₄ is less corrosive • Produces optimum alkylate quality | Impact: <ul style="list-style-type: none"> • Higher acid consumption (+15%) • Low concentration H₂SO₄ is more corrosive • Worse alkylate quality (-0.5 RON) |

| ON STREAM TIME | |
|--|--|
| MECS® DRY GAS SAR TECHNOLOGY | WSA TECHNOLOGY |
| > 98% On-Stream Time | < 80% On-Stream Time |
| Design Factors: <ul style="list-style-type: none"> • Online cleaning of Waste Heat Boiler allows for continuous operation. • High efficiency Dynawave® Process Gas cleaning train removes combustion particles that plug and foul catalyst. | Design Factors: <ul style="list-style-type: none"> • Waste Heat Boiler cannot be thoroughly cleaned online. This leads to frequent shutdowns every 4-6 weeks. • Hot electrostatic precipitators are difficult to maintain and lose efficiency over time resulting in a plugged and fouled catalyst. |
| Impact: <ul style="list-style-type: none"> • Maximized uptime as no shut down required to clean boiler • Lower likelihood of acid condensation, particularly during shut downs | Impact: <ul style="list-style-type: none"> • Frequent shut-downs for boiler maintenance and cleaning • Ongoing maintenance is 50% more than MECS® Dry Gas SAR • Greater possibility of acid condensation during unplanned shutdown. |



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