

New MECS® catalyst developments

Driving innovation in the sulphuric acid market since the 1920s, MECS, Inc. (MECS) remains an industry leader in technology, engineering and equipment dedicated to sulphuric acid producer's needs. As energy savings and environmental concerns create new operational and design challenges for sulphuric acid plants, innovations in catalyst technology provide the solution. Over the past 90 years, the dedicated Research and Development team at MECS has evolved catalyst from pellets to energy-saving rings to low-emission cesium-promoted catalyst. In 2015 MECS commemorates its rich history of catalyst developments with a year-long 90th anniversary celebration.

MECS is the only catalyst manufacturer to offer GEAR® catalyst utilising a unique hexa-lobed ring shape which, combined with an improved catalyst formula, has demonstrated better conversion performance, lower pressure drop and improved dust handling. By geometrically optimising the catalyst shape, GEAR® catalyst offers more surface area for access to active sites than any other catalyst on the market. In addition, when loaded into a catalyst bed, the hexa-lobed ring shape creates a catalyst bed configuration which increases spacing between the catalyst rings, lowering pressure drop significantly compared to standard ribbed ring or daisy-shaped catalyst.

An interesting extension of the unique GEAR® catalyst benefits is now offered for customers who would benefit from combining the low temperature benefits of cesium-promoted catalysts with a GEAR® catalyst shape. An example would be an existing acid plant with the following challenges:

- high dust contamination in the gas stream (such as metallurgical plants or sulphur burning plants with varying quality of sulphur in the feed) or
- desire to increase throughput without increasing pressure drop or SO₂ emissions.

The demonstrated superior dust handling provided by the hexa-lobed ring shape of the GEAR® Catalyst, especially in pass 1, inspired the addition of GEAR® cesium catalyst, GR-Cs, to the MECS® catalyst portfolio. Sulphuric acid plant converters operating with lower bed inlet temperatures have the opportunity to upgrade to GEAR® cesium catalyst for energy savings and excellent dust handling.

Increasing throughput in an existing plant is often a balance, requiring the process engineer to decide whether additional production is worth the higher energy cost or additional emissions. In many cases, blower capacity or plant emissions permit levels can limit the plant's ability to achieve increased output. With the GEAR® cesium catalyst, GR-Cs, as a replacement for vanadium catalyst, a plant can increase converter performance while limiting additional emissions or avoiding excessive load on the blower.

The most recent product enhancement developed by MECS® Catalyst Research and Development is a minor, but high activity boosting modification to the well-established Super Cesium SCX-2000 cesium catalyst formula. This proprietary formula improvement positively affects the SCX-2000 cesium catalyst activity, offering customers higher performance in the fourth and fifth converter passes. The improved formula

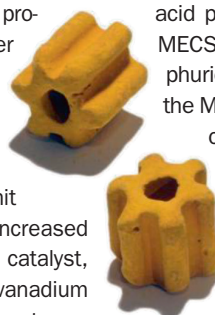
SCX cesium catalyst allows a customer to achieve lower SO₂ emissions through higher catalyst activity and better conversion or the ability to operate at a lower bed inlet temperature of 385°C (725°F).

Extensive lab data on improved formula SCX indicated that it can accomplish the same SO₂ emissions with less catalyst required. In this way, the customer can save on catalyst costs. If lower emissions are preferred, lab data confirmed that improved formula SCX provides lower SO₂ emissions than the former SCX formula at the same catalyst loading. A case study has confirmed lower SO₂ emissions with the improved formula SCX.

The GEAR® and SCX-2000 innovations join the rest of the MECS portfolio offering catalyst solutions to major sulphuric acid producers placing their confidence in MECS technology and know-how. The sulphuric acid industry catalyst workhorse is the MECS® XLP catalyst, a vanadium-based

catalyst installed in hundreds of plants worldwide. MECS is unique in proving that XLP and GEAR® are sulphuric acid catalysts that can be applied in all passes, thus simplifying maintenance complexity, reducing inventory costs, and increasing flexibility

for unexpected replacement requirements for all standard (XLP) and high performance (GEAR® series) applications. In applications where the use of cesium-promoted catalyst offers the activity and performance needed to achieve more activity with less catalyst, producers rely on MECS® cesium catalysts, especially the improved formula Super Cesium SCX-2000. MECS offers sulphuric acid plant producers a strong portfolio of catalyst products with benefits applicable for a multitude of operating requirements.



References

1. Richardson S. (MECS): "New MECS[®] catalyst developments", prepared for Sulphur magazine (Jan 2015).