

CATALYST CASE STUDY NO. 01

SULFUR BURNING PLANT ACHIEVES LOW SO₂ EMISSIONS USING MECS® CATALYST IN ALL CONVERTER PASSES

APPLICATION

MECS, Inc. (MECS) has been providing a variety of vanadium based catalysts to the sulfuric acid industry for over 85 years. The applications have been wide ranging and are often very challenging, but MECS® Catalyst continues to enable high conversion levels and minimized SO₂ emissions. Recent environmental regulations have required SO₂ emissions to be reduced to levels approaching 100 ppm in some areas of the world. This case study describes the use of MECS high performance, low pressure drop catalyst in a new, sulfur burning acid plant in India to reduce SO₂ emissions to 100 ppm.

KIRI DYES AND CHEMICALS LTD., VADODARA, GUJARAT, INDIA

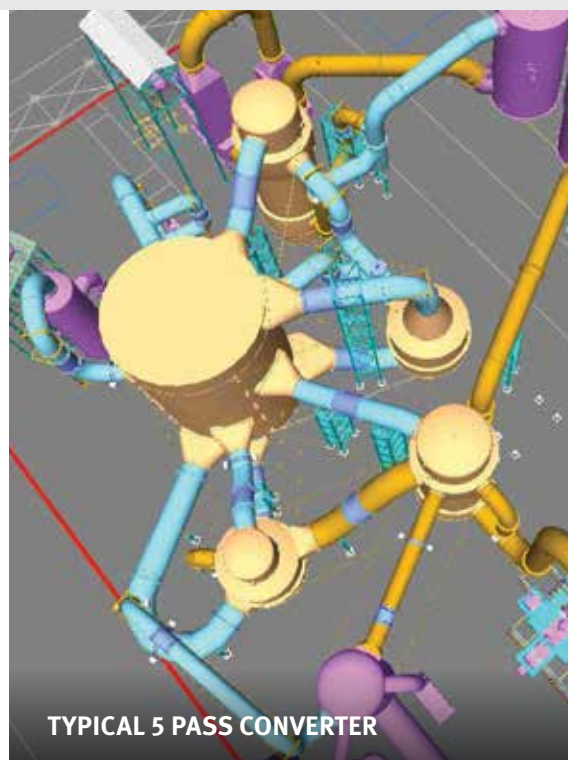
Kiri Dyes is a specialty chemical company in western India. They use sulfuric acid in the preparation of a variety of dye intermediates and also sell some of the acid on the local market. A new 525 MTPD sulfur burning plant was designed and built by Indian companies during 2008-2009, and MECS designed the catalyst loading for the operating parameters listed in the table below.

OPERATING CONDITIONS/REQUIREMENTS

ACID PRODUCTION	525 MTPD
PLANT DESIGN	3 X 2 IPA
FEED GAS	10.00% SO ₂ & 10.95% O ₂
EFFECTIVE CONVERTER DIA.	6650 MM
GUARANTEED CONVERSION	99.91%
EXIT GAS EMISSIONS	100 PPM SO ₂ OR LESS

MECS CONVERTER LOADING DESIGN

This converter arrangement provided a unique situation. MECS® XLP ribbed ring catalyst would have produced extremely low pressure drop through the various beds resulting in poor gas distribution and reduced conversion efficiency. Therefore, the MECS design required the use of LP-110 rings in all of the catalyst beds in order to meet the minimum desired bed pressure drops and to minimize the blower pressure requirements. Cesium catalyst was not utilized in this low emissions design. The catalyst loading was 219 liters per metric ton of acid produced. By optimizing the bed inlet temperatures, the catalyst design maximized the conversion in each pass.



TYPICAL 5 PASS CONVERTER

MECS® LP CATALYST ADVANTAGES:

- Smooth rings for low pressure drop
- High conversion activity from the hollow ring design
- Thermally stable composition
- Uniform dust control for less dust fouling
- Low screening losses



MECS®
CATALYST

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RESULTS FOR KIRI DYES AND CHEMICALS LTD.

Start-up for the new plant was January of 2010. Operating data collected during the six months after start-up indicated that at non-optimized bed inlet temperatures, the stack emissions were 96 ppm SO₂. The various bed pressure drops were measured to be between 50 and 100 mm WC (*within the design parameters*). The measured temperature rises

across the passes indicated good catalyst performance in each of the beds.

Kiri Dyes was able to achieve 99.91% conversion using all vanadium catalyst in a 3X2 converter. The installation and performance of the MECS® LP-110 catalyst throughout the converter has resulted in another very satisfied customer.

DESIGN TEMPERATURE PROFILE

BED	INLET TEMPERATURE °C	OUTLET TEMPERATURE °C
1	420	613
2	440	507
3	440	455
4	440	452
5	418	418.2

MEASURED TEMPERATURE PROFILE

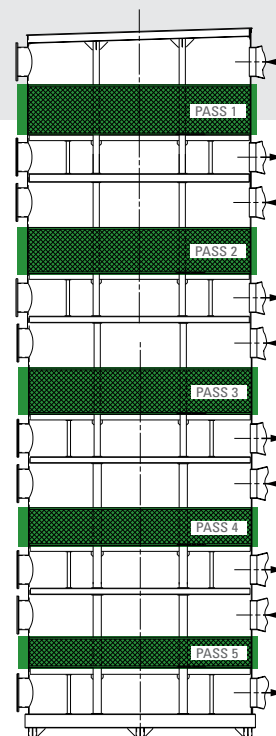
BED	INLET TEMPERATURE °C	OUTLET TEMPERATURE °C
1	410	605
2	425	500
3	435	452
4	458	470
5	427	427



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MECS Inc.
CATALYST
SO₂ & SO₃



MECS® LP-110: ALL PASSES

**NORTH AMERICA
MECS HEADQUARTERS**
Chesterfield, Missouri, USA
Tel: +1-314-275 5700
northamerica@mecsglobal.com

SOUTH AMERICA
Alphaville, Sao Paulo, Brazil
Tel: +55-11-4166 8535
brazil@mecsglobal.com

EUROPE/MIDDLE EAST/AFRICA
Brussels, Belgium
Tel: +32-2-658 2620
europe-africa@mecsglobal.com

Moscow, Russia
Tel: +7-495-797 2200
moscow@mecsglobal.com

Dubai, United Arab Emirates
Tel: +971-4-428 5615
dubai@mecsglobal.com

Johannesburg, South Africa
Tel: +27-11-218 8618
southafrica@mecsglobal.com

ASIA PACIFIC NORTH
Shanghai, China
MECS Chemical Plants
Equipment (Shanghai) Co., Ltd
Tel: +86-21-3862 2888
shanghai@mecsglobal.com

ASIA PACIFIC SOUTH
Mumbai, India
MECS India Private Ltd.
Tel: +91-22-6774 9500
india@mecsglobal.com