

Nitric acid debottlenecking



Phased program of development to debottleneck the nitric acid plants

Situation

A customer highlighted discrepancies in the production efficiencies achieved on sister plants and a desire to achieve higher production rates in order to debottleneck the acid production for the site.

Johnson Matthey's solution

Johnson Matthey (JM) completed a review of the current gauze packs utilised and identified the target areas for development to improve the overall site efficiency, (note, the gauze development was done in parallel with process improvements).

The development areas identified were:

1. Improved light off characteristics (time to peak efficiency)
2. Longer plateau of peak efficiency (overall campaign efficiency and length)
3. Reduced pressure drop
4. Improved metal recovery

Over the period of the project (three years) incremental step changes were made to the gauze and catchment (getter) designs to each campaign to address the improvement areas. The design changes were made on the basis of the results from comprehensive post campaign analysis (weight loss, flow distribution, contamination, metal loss) of the gauze packs.

Program success

Conversion efficiency: a 4.7% efficiency improvement for the site was achieved at the end of the three year period.

Pressure drop: a reduction in pressure drop at the end of the campaign following catchment modifications to ensure full production rates were achieved.

Improved metal utilisation / recovery: platinum metal losses halved from 0.1 g/t to 0.05 g/t, palladium metal losses reduced from 0.18g/t to 0.16 g/t.

Overview

Overarching goals were achieved from the program and the plant is now running at record efficiencies and production rates (overall production increased by 14% per day).

In addition the resultant cost per tonne of acid over the course of the program has been reduced by 20% (assumes constant metal price) and the campaign lengths increased by 40%.

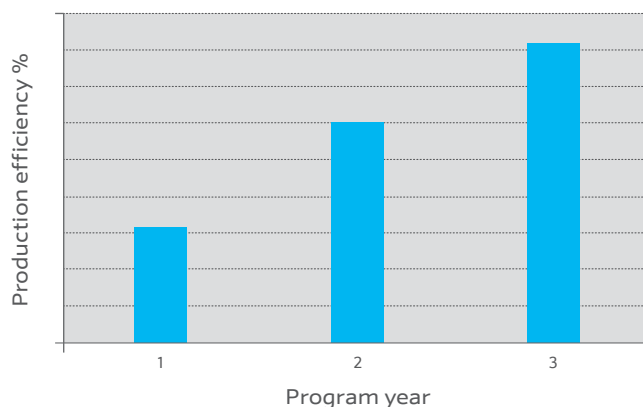


Figure 1: Production efficiency (%) improvement over the program.

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