

Cyclone upgrade: FLS KREBS® comes out on top in battle of the cyclones

FLS KREBS® gMAX® cyclones proved their superior classification performance over both old and new competitor models at a gold mine in Ghana, supporting significant growth in gold recovery at the mine.

The gold mine in Ghana's Ashanti gold belt is expected to produce between 100,000 oz. and 120,000 oz. (2.8-3.4 tonnes) from stockpiled material. The mine currently runs FLS Krebs gMAX cyclones in its secondary milling classification circuit, having switched from competitor cyclones back in 2020 to facilitate an increase in plant throughput. The gMAX cyclones also saw off the competitor's latest model cyclones in the process.

Road to increased production:

In 2020, the mine was running a 16-place cyclone cluster, which produced 450 tph of overflow with a P80 of 106 µm and feed density of 61.1%. The aim was to increase throughput to 600-700 tph in the overflow, whilst maintaining the P80. They also intended to extend wear life and were looking for a supplier who could offer improved site support.

Due to budget constraints we proposed an OPEX model to replace cyclones monthly. We also used the existing overflow piping and underflow launders to further reduce the cost to the mine.

Operating conditions during the trial were adjusted to a higher tonnage (700 tph). This led to an increase in the feed density as the dilution water had to be reduced due to hopper constraint. This led to a coarser cut with P80 dropping as expected.

Our gMAX15 cyclones achieved an average 5% higher separation rate than the competitor cyclones over multiple sample periods (Table 1). In addition, the gMAX had an optimal consistent underflow density with reduced bypass of fines and circulating load. It's also worth noting that our cyclones achieved this even with a nonoptimal inlet pipe design. On the basis of this performance, the customer placed orders for several more gMAX15 cyclones.



Table 1

Cyclone Tag	Percent Passing 106um
A-Krebs	72.31
B-Competitor	67.7
C-Krebs	71.62
D-competitor	67.16

The competitor strikes back:

This was not quite the end of the story, however. In response to the performance testing, the competitor introduced their latest second-generation cyclone model to the site as an alternative to the gMAX15 cyclones. Would this be their fightback?

The short answer was: no. The competitor's new cyclone seems to include a barrel section, which leads to poorer separation especially at high densities. In fact, the design is reminiscent of our old D-series model cyclones, which we introduced 50 years ago, and have since gone on to evolve into the superior classification performance of the gMAX cyclones. Inevitably, the competitor's new model cyclone underperformed by not achieving their promised capacity and cut point and was eventually replaced by the customer with our superior gMAX technology.

The result:

Ultimately, the customer decided to replace all 16 cyclones in the cluster with KREBS gMAX15 cyclones, delivering a significant boost to both production and financial performance. Due to the total replacement the cyclone cluster was no longer the bottleneck and enabled the customer to achieve an additional 50% (200-250tph) capacity, leading to an increased revenue to the mine.

We also supplied a set of spares for each cyclone and left the mine grateful for the service we provided throughout the cyclone conversion project. It's more proof that FLS Krebs gMAX cyclones perform better at higher densities and provide better classification than competitor models – even those heralded as new innovations.

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