



FLS knocks-out competition with KREBS® UMD™ pumps

A large copper mine in the western US has been running KREBS® UMD™ pumps from FLS for a number of years. Over that time, the pumps have been proven time and again in tests against competitor pumps. These champions remain in operation today.

An Arizona copper mine was looking for a solution that would reliably maximise uptime in one of their most important pump installations: the ball mill cyclone feed line. Their search led them to FLS and our KREBS Ultimate Mill Discharge (UMD) centrifugal slurry pump. Two UMD 26x22-60 (650 mm) were ultimately installed at the mine: one on cyclone feed line 1 (CFP01), and another on cyclone feed line 2 (CFP02).

Always looking to improve

UMD pumps are the heavyweight champions of the pump world, able to handle even the toughest conditions. But even champions cannot rest on their laurels for long. In order to remain at the top of their game, they must continue to upgrade their skills and improve their performance.

Which is exactly what FLS has done with the UMD pumps in Arizona. Since installation, we have taken these pumps through a series of size, material, and design upgrades. In the early years, for example, this included moving to a laser-clad tungsten carbide wear ring material from the original high chrome alloy – a change that resulting in a 12-14 week increase in wear life.

In 2020, FLS again upgraded the pumps when higher throughput and solids concentrations meant their original sizing had become too small to keep up with the demands placed on them. FLS was therefore asked to increase pump size from 26x22-60 (650 mm) to 28x26-65 (700 mm) – which we duly did. We also further advanced the design of the CFP01 pump in 2021, when the casing was switched to a ribbed design with added reinforcement in the high-velocity zones to protect against pressure surges from blockages.

The CFP02 pump casing followed suit in 2022, when we changed it for a wide flow casing to better handle the wide range of flows. The new casing features a modified hydraulic design that minimizes velocity past the cutwater in low flow (oversized) conditions. Importantly, it can also be swapped in without any piping changes. The result is an upgrade that is easy and time-efficient to install, but that dramatically reduces wear patterns when operating below 70% BEP flow.

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Challenging the champions

These upgrades have led to significant improvements in the performance of the UMD pumps. But the only way to know whether they remain the best solution for the job is to test them against others. Over the years, two competitor pumps have arrived – but ultimately failed – to challenge for the title.

The first pretender to the throne – a 28x26 (700 mm) unlined metal pump – was tested in the CFP02 position. Unfortunately for this competitor, its suction liner and impeller failed after only 13 weeks and five days of operation. This proved decisive: the trial ended after an economic study found that the new pump's total cost of ownership was almost double that of the UMD. Despite spare parts being twice as expensive, they simply did not last twice as long. The pump also maxed out the lifting capacity of the mine's crane and was difficult to maintain.

Unsurprisingly, the mine elected to reinstall the original UMD.

The second challenger took to the ring in 2021. This 30x26-70 (700 mm) split-case rubber-lined pump was installed in the CFP01 position. However, it was soon discovered that maintenance was again much more difficult than on the UMD. Rebuilds took two, sometimes even three, shifts on the competitor, whereas on the UMD, they took just one. This was because of a larger footprint and greater number of components on the competitor pump.

It might have been OK if the competitor had demonstrated significantly longer time between rebuilds. But it did not. Wear life was four weeks on the rubber liners and six to eight weeks on the high-chrome impeller – neither of which offered any improvement on the UMD. Finally the mine decided to reinstall the UMD after the competitor pump's bearing assembly caught fire and the competitor was unable to provide spares in time.

The UMD pump was reinstalled in just two weeks: a short lead time made possible because FLS keeps KREBS parts in kits for the customer – ensuring all parts are available when needed.

Test for the best: the results

Compared to the first competitor, the UMD pumps demonstrated similar wear life, but won out on maintenance time. UMD components are also lighter weight and were half the cost of the competitor's spare parts. Head-to-head with the second competitor, the UMD pump won on both wear life and maintenance time.

Pump	Longer Wear Life	Shortest Maintenance Time	Lowest Total Cost of Ownership
FLS UMD	✓	✓	✓
Competitor A	✓	✗	✗
Competitor B	✗	✗	✗

These victories were hard fought. To keep them in the ring, FLS has actively engaged with the mine through a continuous series of improvements and upgrades. These have kept the pumps on top of demands for increased production and shorter maintenance cycles. In addition, we dedicate specific stocks of spare parts to be kept on hand for the mine, as well as undertaking weekly site visits to help the mine's maintenance staff. This meant we were always available, with the necessary components, to respond to any and all scenarios.

This investment has proven its value. The KREBS UMD pumps from FLS delivered the lowest total cost of ownership versus the two competitor pumps. Even after operating for almost a decade, these heavyweight pumps remain the champs.



KREBS® UMD™ pump