

## IT PAYS TO REDUCE TOC

Achieving the lowest total ownership cost (TOC) on plant and equipment is essential to the profitability of any operation.

Centrifugal slurry pumps lie at the heart of many operations in mineral processing, tailings and sand and gravel applications.

Amongst the various pump manufacturers in the market, it is the Warman® centrifugal pump range from Weir Minerals that illustrates perfectly the longer-term cost benefit of purchasing durable equipment.

Warman® centrifugal slurry pumps offered by Weir Minerals have been renowned in the market for 77 years for its superior level of reliability.

Pump inventor Charles Warman developed one of the first rubber-lined slurry pumps in 1938, and its simple design, robust build and easy serviceability has made it a popular choice of slurry pump ever since.

“The Warman AH pump has been the pre-eminent general duty to heavy duty slurry pump for decades in sand and gravel, mineral processing, tailings and mill circuit,” said Weir Minerals Director of Engineering Ron Bourgeois.

“Having the same reliable pump in multiple duties allows customers to use many common spare parts and maintenance practices.”

The ruggedness, durability and quality materials of the Warman® pump are designed to provide trouble-free operation and eliminate unplanned maintenance stoppages.

While Warman® pumps are still built around Charles Warman’s basic design principles; innovation has improved the pump’s performance and helped keep it at the forefront of the market.

Over the years the hydraulic efficiency of the pump has been improved and new longer-wear materials are employed to provide even longer part life.

Much of this innovation has been a result of either direct customer feedback or from observing how customers use the product.

“Our customers are our products’ best critics,” said Weir Minerals Director of Strategy, Sales and Marketing Fred Bradner.

“They let us know what works and what doesn’t and we use this information to continually improve the performance of our products.”

Weir Minerals Global Centrifugal Pumps Manager John Otten agrees on the importance of customer feedback in the product development of the Warman® pump.

“Customer feedback is important because we find out about their problems and our mindset is to provide solutions,” Mr Otten said.

The solution to customer problems are explored and developed by Weir Minerals’ extensive R&D program.

At their Pump Design Centre of Origin (DCO) in Sydney, Australia, Weir Minerals has dedicated teams of engineers and technicians focused on Warman® pump R&D and the development of advanced alloys and elastomer materials.

Meanwhile the design centre in Madison, Wisconsin, USA is home to additional teams of engineers and designers working on the Warman® MCR®, MCU®, HTP, XU, MDC and GSL pump product lines.

Weir Minerals has another 19 DCOs around the globe. While each has a specialty, their knowledge is shared across the entire Weir network.

At the DCOs, new Warman® products undergo extensive lab testing using test rigs, as well as virtual testing using modern computation techniques such as computational fluid dynamics and modelling.

This virtual testing means Weir Minerals can evaluate numerous variations of the Warman® pump range before manufacturing commences.

This product development and testing has resulted in many innovations that have lowered customers’ total ownership cost.

One such example is the Warman® MCR® mill circuit pump, used in mill discharge, cyclone feed and wet crusher applications.

The new Warman® MCR® pump was designed with an easily adjustable throatbush that has helped reduce wear and save on downtime.

The full-face adjustment capability of the throatbush is designed to decrease wear. Meanwhile the clam-shell quick change procedure can help reduce the total wet-end change out time for the large MCR® 550 or 650 pumps by 50 per cent.

“Weekly adjustment of the pre-swirl throatbush of the MCR pump has dramatically improved the wear life of both the throatbush and impeller in severe duty applications,” said Weir Minerals director of engineering Ron Bourgeois.

Because the mill circuit demands a longer wear life, the MCR® pump is equipped with extra-thick interchangeable metal or rubber liners that allow customers to optimise different materials for their application.

Beyond the mill circuit, Warman® pumps include a number of other innovations that optimise performance for lowest TOC.

The Warman® froth pump featuring a continuous air removal system (CARS) is designed to provide problem-free pumping of the most tenacious froths in mineral circuits.

Warman® AHPP pumps for tailings applications are designed to achieve the highest possible pressure transfers. And the Warman® WBV® pump range features integrated impeller agitation vanes to prevent sump blockages.

The new Warman® WBH® pump is designed for heavy-duty process, feed and tailing applications.

The WBH® pump features a one-point throatbush adjustment that can be easily operated while the pump is running.

Because the throatbush can be kept close to the face of the impeller without shutting down the pump, both wear and downtime are reduced.

The wear components of the WBH® pump are designed and optimised using state-of-the-art Computational Fluid Dynamics methods.

The WBH® pump also offers long wear life thanks to features like large capacity bearings, commercial labyrinth-style bearing end cover seals, encapsulated high-pressure rubber seals and high-pressure metal and rubber liners.

Streamlined impeller and volute design flow paths improve efficiency and energy use and provide outstanding slurry handling. And a large diameter Warman Hi-Seal® expeller seals effectively even under high-pressure intakes.

Meanwhile the Warman® WRT® impeller-throatbush combination increases wear life by an average of 30 to 50% compared to the standard Warman® AH® pump impeller-throatbush combination. Its lower NPSH requirements also contribute to extended wear life thanks to the enhanced hydraulic performance.

The WRT® impeller-throatbush combination is also designed to reduce power consumption and cuts costs. Rubber and metal part combinations are available. And updated Warman® WRT® parts can be easily retrofitted to your existing Warman® pump.

Innovations like these are all driven by the goal of lowering TOC. Customers understand and appreciate the benefits of this, as evidenced by the fact that the Warman® range of centrifugal slurry pumps is still a main contender in the slurry pump market.

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