

KREBS gMAX[®] Cyclones, millMAX[™] Pumps & Technequip[™] Valves



With KREBS separation systems it's easy to see what you've been missing...



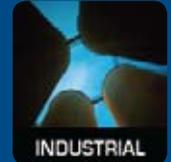
MINING



PUMPS



VALVES



INDUSTRIAL

FLSMIDTH
KREBS

EXCELLING IN SEPARATION SOLUTIONS SINCE 1952



FLSmidth Krebs is the world's leading manufacturer of hydrocyclone classification equipment and has been serving the process industries since 1952. With over 50 years of successful involvement in equipment for the unit of separation, classification, and dewatering, Krebs has built an unsurpassed reputation for technical expertise, quality products, and customer service.



Experience and knowledge gained through the successful completion of challenging worldwide projects has resulted in unique capabilities for problem solving in such diverse fields as aggregates, chemicals, alumina, mining, oil and gas, pulp and paper, pollution control, power generation, water, and wastewater.

Krebs is committed to consistently striving to make product improvements that will better serve our current and future customer needs in all industries and various applications through the application of hydrocyclone and pumping technology.

Some of the markets served by Krebs:

MINING MARKETS

- **Aggregate & Industrial Minerals**
- **Coal**
- **Hardrock Mining**
- **Alumina**

INDUSTRIAL MARKETS

- **Automotive**
- **Plastics Recycling**
- **Industrial Wastewater**
- **Potable Water**
- **Municipal Wastewater**
- **Chemical & Petrochemical**
- **Food**
- **Power / FGD**
- **Dairy**
- **Pulp & Paper**
- **Coolant Cleaning & Parts Washing**
- **Groundwater Remediation**
- **Refining**

INDUSTRIES SUPPORTED

MINING

New era, new engineering, and a whole new performance standard for separation technology. The new MAX line from Krebs, leading the industry worldwide since 1952.

FLSmidth Krebs has installed over 100,000 hydrocyclone systems and 325 pumping systems worldwide, and has been awarded contracts by all of the large international mining companies. These customers include Alcoa, BHP-Billiton, Codelco, PT Freeport, Goldfields Ghana, Iluka Resources, KCGM, Newcrest Mining, Newmont Mining, Ok Tedi, Placer Dome/Pacific, Rio Tinto, and Xstrata.

New cyclone designs and materials of construction have been developed to meet industry needs for devices that offer higher capacities, finer separations, and greater durability.

FLSmidth Krebs provides individual hydrocyclones as well as entire multi-unit hydrocyclone sub-systems (known as manifolds) that can be supplied with valves, piping, collectors, support structures, instrumentation, and other accessories.



INDUSTRIAL

Krebs hydrocyclones use centrifugal force to physically separate fats or solids from water or water based solutions regardless of the flow rate.

Fluids containing fats are fed tangentially into the hydrocyclone. As the mixture flows through the unit, it accelerates sending the lighter fats to the center for removal through the overflow. Cleaned water reports to the underflow.

Our solid separators are equally efficient, sending unwanted solids directly to the underflow stream. Clean water flows through the overflow. Simple as that.

You retain valuable product while unwanted waste is removed in one efficient operation. Yield is improved. End-product quality and process performance are greatly enhanced. And downstream equipment, such as ultra-filtration, are protected.

Simply put, it's a whole new spin on performance.



PRODUCTS & SERVICES



PRODUCTS

FLSmidth Krebs' primary focus is on the proper design, selection and application of hydrocyclones and slurry pumps. Krebs gMAX® hydrocyclones and CycloClean® Systems are a step above. Installed in either in-line or radial manifolds, or in vessels, Krebs delivers innovative hydrocyclone solutions for your solids and oil recovery needs. Combined with unparalleled application experience, Krebs provides a performance edge that's hard to beat.

In addition to the most complete hydrocyclone offering available, Krebs offers a broad range of complimentary products. These products support and enhance hydrocyclone operation and include hydrocyclone manifolds and vessels that uniformly distribute the feed to each hydrocyclone and collect the overflow and underflow products from the hydrocyclones. Krebs hydrocyclone manifolds allow for ease of installation, maintenance and retrofit.

Krebs supplies a complete line of millMAX™, gravelMAX™, and slurryMAX™ severe-duty slurry pumps to meet any slurry pumping requirements.

Krebs also offers Technequip Valves, the highest quality replacement parts and hydrocyclone accessories such as Krebs CycloWash® and CycloStack®. Finally, FLSmidth Krebs provides high quality spiral concentrators.

TESTING SERVICES

After thousands of installations, our experienced engineers are frequently able to specify the proper hydrocyclone configuration without testing. When testing is required our hydrocyclone test laboratory in Tucson, Arizona is available for verification of our equipment, components, and slurry materials under simulated operating conditions.

Testing is also regularly conducted at field locations as required. Individual hydrocyclones, test skids or pilot plants can be furnished and staffed for on-site customer evaluation. Please keep in mind that we cannot work on hazardous materials.

For more details on our test laboratory, please contact FLSmidth Krebs.



RESEARCH & DEVELOPMENT

Since its inception, Krebs has maintained an ongoing program designed to find new products, new materials and better ways to meet the requirements of a broad range of applications. In recent years extensive research and field testing has yielded important advances in product design, as well as a range of special alloys, elastomers and ceramics designed to promote longer wear life for cyclone parts and linings.

To achieve maximum cyclone wear life, materials of construction must be provided that will resist the destructive action of abrasion, corrosion, temperature and pressure. Krebs research and development programs have yielded a range of high-performance materials that have contributed to Krebs reputation for producing the longest lasting, more efficient cyclone in the industry.

Recent advances in materials technology include the Krebs Formula RR high resilience rubber compound, our new BPC rubber and special silicon carbide and alumina ceramic metals for use as highly abrasion-resistant cyclone liners.

REMANUFACTURING CUSTOMER SERVICE

Cyclone liners that are well maintained will pay you dividends. Worn cyclone liners result in poor cyclone performance and can cause housing damage. So, when your liners start to wear, just send your Krebs Cyclones to one of our Manufacturing facilities. We'll remove the old liners, clean the housings thoroughly inside and out, install new genuine Krebs liners and repaint the housings - all for one competitive price.

We make sure that your new liners are of the highest quality and that they are installed per factory specifications with the cyclone returned to like-new condition. The resulting long wear life ensures high process efficiency by maintaining the proper internal cyclone geometry and reducing system downtime for unscheduled maintenance.



At FLSmidth Krebs we are committed to delivering the highest quality equipment backed by the highest level of technical service and support. We are committed to our research and development programs and continually improve our products to ensure the highest quality products are delivered.

Krebs takes pride in the service and support offered to our customers in technical assistance, parts inventory and product quality. Krebs has over 50 years experience in processing, separation and classification applications. We have an extensive inventory that is maintained to provide prompt shipments of spare parts -- often within 24 hours.

In addition to our Tucson, Arizona warehouse we also have complete parts warehouses in Alabama, Canada, Kentucky, Nevada, and West Virginia. Krebs' Guaranteed Fit on all liners and housings and our Guaranteed Quality of all materials benefits maintenance and operational aspects by improving hydrocyclone efficiency and lowering product wear.

TECHNOLOGY

Krebs gMAX™ Inlet

Optimum cyclone performance relies on minimizing turbulence while maximizing tangential velocity. The new gMAX® cyclone focuses on these two important cyclone factors, significantly advancing cyclone performance. To achieve the two design criteria, the gMAX® incorporates performance-enhancing improvements to the inlet head, cylinder section, cones, and apex.

The Krebs gMAX® inlet has improved upon the Krebs involute feed inlet that had been the state-of-the-art in hydrocyclones for over 40 years. The outer wall involute design entrance pre-classifies the feed solids prior to entering the main body of the cyclone. The upper part of the gMAX® also includes an improved vortex finder and top cover plate liner design. These improvements to the inlet head result in less misplacement of coarse material to the overflow and dramatically increased wear life. This longer wear life for the gMAX® inlet, combined with premium ceramics in the lower parts of the cyclone, will greatly increase complete cyclone repair frequency.

Through the use of CFD analysis, Krebs has designed the gMAX® cyclone with sharper upper cones followed by longer angled lower cones. This combination maximizes tangential velocity in the upper part of the cyclone. It then provides a long residence time in the critical

separation zones in the lower part of the cyclone. This results in a substantially finer separation with fewer fines in the underflow.



KREBS® SmartCyclone™ System

introduces electronic sensing and communications to Krebs cyclone separator products. By doing so, it allows the cyclones to actively participate in plant control systems, plant alarm control systems, and in proactive maintenance planning.

With a SmartCyclone equipped plant, the cyclone sensors can report the functional state of the cyclone by sensing the viscosity/velocity of the slurry flow from each cyclone individually. The sensors can report the status of the pipe and cyclone wear liners, so that liner purchasing and relining operations can be planned with greater control and more in advance. Finally, the sensors can report when a cyclone, the SmartCyclone system itself, is malfunctioning. Because multiple sensors can be mounted on each cyclone, the individual performance characteristics of each unit can be monitored and adjusted as necessary in real-time.

millMAX Pumps

Add a millMAX™ Pump to your separation process and watch your pumping costs drop. As the leader in cyclone technology, we make sure your pumping system optimizes your separation requirements.

Krebs millMAX™ severe-duty slurry pumps have a unique design developed exclusively for grinding mill discharge duties and other abrasive slurries. FLSmith Krebs offers wet end conversions or complete pump assemblies to meet customer desires and demands. The millMAX™ Pump features a patented on-line wear clearance adjustment, which minimizes cost-per-ton pumped compared to conventional hard metal and rubber lined pumps. This patented design insures maximum wear life of the wet end components and optimum cyclone pressure throughout the life of the pump.

The primary applications for the Krebs Metal Slurry Pumps are mill discharge, crusher slurry, sand and aggregate or any coarse solids or other severe, abrasive slurries especially in the copper, gold, lead-zinc, coal, or phosphate plants. The most dramatic savings will be in these applications, though savings will also be realized on fine solids, like iron ore or kaolin.

Applications

- Mining and mineral processing
- SAG mill discharge recirculation
- Copper
- Iron-ore
- Gold
- Oil Sands
- Cyclone feed
- Tailings
- Mill discharge
- Sand and gravel
- Industrial processing
- Heavy-duty abrasive slurries



Technequip Valves

The Technequip™ Knife Gate Valve is a true bi-directional slurry knife gate valve. Its massive rubber sleeves were designed to seal and withstand the harsh abrasive duty inherent in mining and milling facilities.

The Tech-Taylor Valve is used by nearly every mining company in the world. It was invented by a mining man for the mining industry. The Tech-Taylor valve is the best answer for pump isolation and operates in any orientation. It does all the work by itself. You just operate the pumps...and you can run both pumps simultaneously!

The T-1 Vacuum Breaker Valve is a one-way free ball slurry check valve. It is mounted on the high points in a slurry line to break the vacuum created upon pump or power failure. It has been used since the 1970's and is particularly useful in cold climates where temperatures can cause tailings lines to become brittle and much more susceptible to fracture during a vacuum.





FLSmidth Krebs' expertise in the mining and process industries spans more than five decades. Our innovative technologies in size separation and classification, solids de-watering, and de-oiling meet the high-performance demands of dozens of industries – and in some of the most challenging process environments.



FLSmidth Krebs is the leading provider of hydrocyclone technology. Krebs has worldwide offices in the USA, Australia, Austria, Brasil, Chile, China, the Philippines, and South Africa.



Contact your Krebs representative:



www.Krebs.com or
www.FLSmidthMinerals.com

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