

Drive & Control profile

Linear Motion Helps Metlsaw Keep Its Cutting Edge



Metlsaw's fully automatic CF2 Series Ferrous Cut Off Saw is capable of precision cutting of gang-fed material.

In the world of precision-manufactured parts, if you want to cut ferrous or nonferrous materials in one accurate cut with little or no subsequent machining required, Metlsaw is a company you should get to know.

Twenty-nine years ago, they invented the technology that put them on the map with a unique combination of accuracy, speed,

and automation. And today, Metlsaw products still stand apart from any other saws.

But for Benicia, California-based Metlsaw to maintain their exceptional reliability as a manufacturer supplying a variety of industries including automotive, appliance, electrical, architecture, aerospace, aviation, transportation, pipe & tubing, sports equipment

Challenge

Help industry leader create cutting tools that provide extreme precision and high load capacity

Bosch Rexroth Solution

- Rexroth Ball Rail® System
- RailSeal™ cover strip

Benefits

- Load capacity up to 3 times more than typical systems
- Enable precision positioning up to 0.003± inches
- Modular parts simplifies saw design, ordering and stocking
- Raceway design enables 30% increase in load capacity
- Contaminant-proof sealing
- Lubrication system offers 5 to 10 million meters of maintenance-free travel



Rexroth Ball Rail linear guides support the saw assembly both vertically and horizontally to provide extreme stability and to maintain a squareness of ± 0.0005 inch, thereby achieving a surface finish as fine as 32 micro inches.

and many more, they turned to Bosch Rexroth to help keep their machines ahead of the competition.

“We chose to work with Bosch Rexroth for a lot of sound business and technical reasons,” says Lisa Forman, Metlsaw’s vice president of operations. “We are an original equipment manufacturer and our customers have extremely demanding timetables.” Productivity in cutting is essential. Fast, accurate cuts, easy setup and no downtime are fast becoming expected features. The key to remaining competitive is to make operation ever more accurate, easier, and more reliable, along with great service at every point in the machine’s lifecycle. Flexibility is also important—to meet not only the varied needs of a single user, but also the diverse needs of the many markets Metlsaw serves.

Precision movement of heavy loads is typical of Metlsaw’s needs for linear motion. Metlsaw uses Rexroth Ball Rail® Systems throughout its product line. An example is the CF2 Series Ferrous Cut Off Saw, a fully automatic system capable of precision cutting of gang-fed material. Rexroth Ball Rail linear guides are used both in the saw head for moving the saw and in the back gauge for advancing the metal into the sawing area.

The CF2 can cut pieces as short as $\frac{1}{2}$ inch, with a tolerance of ± 0.003 inch in positioning accuracy.

Rick Trees, sales engineer for Bosch Rexroth, notes that Ball Rail Systems are ideal for applications like Metlsaw’s. They combine accuracy with high load capacity, along with a wealth of features designed to give Metlsaw lower installation costs and end users high performance, long life, and reliability.

The Rexroth profiled rails are available in up to five accuracy and four preload classes, each with high load-carrying capacity and rigidity. The compact systems come in eight industry-standard sizes and offer the same load rating in all four main load directions. Individual components can be replaced at any time.

The Rexroth Ball Rail System is modular and parts are interchangeable. “It’s very simple,” says Lisa Forman. “With other manufacturers, the rail and runner block are machined to match.

You can’t easily change one without changing the other, so you would have to replace the entire assembly. You can’t replace one section, you have to replace the whole thing.” The Rexroth system rails and blocks are machined to exacting tolerances—especially in the ball track zone—to allow interchangeability of parts. Any runner block can be used with any rail in a given dimensional family. Compared to the difficulty of changing a complete assembly retrofit, simply replacing a runner block saves significant time and money.

Interchangeability also simplifies ordering and stocking because it becomes much easier to mix and match products. For example, Metlsaw can inventory only one type of rail, but several types of runner blocks, as required for different machines.

The latest generation of the Rexroth Ball Rail System was first developed for machine tools and industrial robots. It features a new runner block design. This design helps shorten assembly time, cut machine cycle times, increase production while reducing lubrication and maintenance costs.

It’s the bearings in the runner block that must carry the load. In Rexroth runner blocks, recirculating balls contact a large surface area on the ball track—a design that can withstand a high load capacity. Furthermore, the geometrically-optimized design and extremely smooth surface finish of the Rexroth raceway result in lower friction during ball

recirculation and allows for a 30% increase in dynamic load capacity.

Contaminant-proof sealing is also essential for Metlsaw's machines. The sawing operation generates metal particles. While a vacuum removal system handles most of the debris, machine reliability demands that chips be kept out of the Ball Rail's internal workings. "There's no faster way to wear out a guideway than metal chips and flakes," notes Trees. "Metalworking applications like sawing or grinding are tough on moving parts if you don't have adequate sealing to protect the parts."

The Rexroth Ball Rail System features a one-piece cover, its RailSeal™ cover strip, available for any size rail, that easily snaps into place. Installation is much faster than the traditional method of individually plugging each hole. Covers are available in lengths up to 1000 mm.

Forman says, "The cover rail strip is tremendous for us. It saves time and installation is easy. It's a single clip-on unit that installs fast and reliably."

"I also like the lubrication system," Forman adds. "It virtually eliminates the need for lubrication by the customer for years to come." The Rexroth Ball Rail is equipped with a lubrication system that provides up to 5 to 10 million meters of maintenance-free travel. The result is reduced lubrication-related maintenance costs—including costs of buying, storing, applying, and disposing lubricants and lubricant packaging. The

integrated lubrication system uses a foam insert inside the runner block, releasing lubrication slowly over time.

In the CF2 saws, the Ball Rail System is used to move the saw blade across the stationary metal. To ensure accurate, straight cutting, the blade must maintain a vertical and horizontal squareness of

± 0.0005 inch. The saw can achieve a surface finish as fine as 32 microinches, which usually eliminates the need for post-cutting machining. All the while the saw can move up to 500 inches per minute in the cutting direction and 1000 inches per minutes in the return direction. Two Ball Rail linear guides support the saw assembly both vertically and



Rexroth Ball Rail linear guides equipped with RailSeal™ cover strips are used to advance metal into the sawing area. The patented rail cover reduces installation time and contamination failures, and simplifies the replacement of damaged rails.

horizontally to provide extreme stability to the blade. The rigidity of the rails offers additional resistance to allowing the blade to wobble or lose vertical or horizontal squareness.

A second set of Ball Rail guides is used in the back gauge to feed stock forward for cutting. Metlsaw can supply a back gauge to any length the customer requires. The back gauge can advance material at speeds up to 500 inches per minute. For lengths longer than can be obtained from a single rail, Rexroth supplies a special joint to Metlsaw that allows rails to be aligned end to end without having to use a standard butt joint. The result is a more seamless rail end to end. Over long distances, a butt joint presents assembly difficulties to ensure the perfect straightness

required for accurate feeding of material. The special joint simplifies this process, speeding assembly without time-consuming alignment of individual rails.

Metlsaw needed a partner in linear motion and Rexroth clearly delivered.

“Our Ball Rail System offers a load capacity that is almost three times the typical system, so that they can still feed heavy loads quickly and accurately,” Trees says. “We offer more choices, longer product life, higher speeds, and reduced cycle times. And with the pre-lube feature it’s virtually maintenance-free.”

“Another reason we chose to work with Rexroth was their roadmap for the future,” adds Forman. “The company has always come through for us in the past with

great engineering support and product innovations like the lubrication system and seal cover. We have the confidence that they’ll bring the same quality and performance to future products. Our innovation depends on suppliers who can meet tomorrow’s challenges.”

For driving and guiding motion, Bosch Rexroth is a company with a cutting edge. They offer a high degree of vertical integration by controlling source materials, design and manufacture of their product.

“Bosch Rexroth engineering, service and design are a tremendous help to us,” Forman adds. “Products work as specified and if we have problems, they get fixed fast. So we’re going to keep our cutting edge in performance.”

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