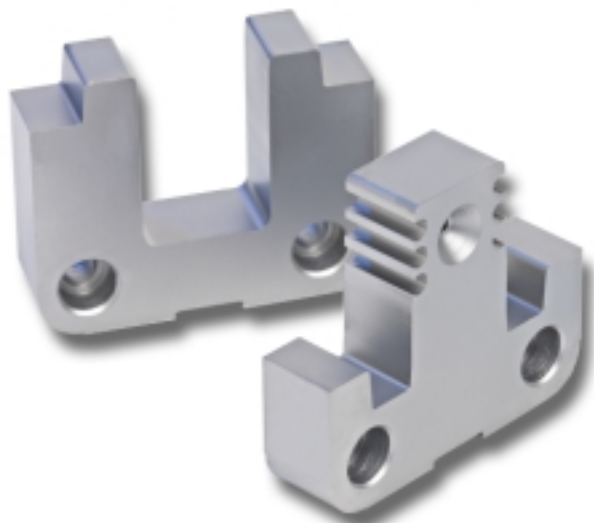




## Revolutionizing the **MOLDMAKING INDUSTRY** One Lock at a Time



Injection-molded components are only as good as the molds. Mold halves that don't mate together cleanly, pins that don't align, and mold locks that scrape and bind result in scrapped parts and millions in lost revenue. Klaus Wieder understands these problems all too well, and if he has his way, scrapped parts resulting from poorly designed mold locks will be a thing of the past.

Thirty-five years ago, Klaus began his career as a journeyman mold maker. Since then, he's



been a mold designer and product engineer, working with companies such as Cito, Gillette, Delphi, GE, Johnson & Johnson and Minitube. After being bitten by the entrepreneur bug in 2002, he started his own company, Helenville, Wisconsin-based AccuraTec Inc. His company's mission is to identify new ways to make molds work better. Since starting his company, he's patented and sold several designs — the newest and most innovative of which is the Tri-Side Lock, a mold lock that combines roller, straight and taper lock technology, for both alignment and for maximum full lockup holding strength.



“When a core and cavity come together, you can see the inherent engineering flaws in a standard mold lock,” says Klaus. “Almost immediately on initial engagement, even with a slight misalignment, the lock sides’ bind as the lock attempts to realign. The molder cringes as the parts either lock together or fail entirely. The problem gets worse with mold machines with worn tie bars, causing at least one half of the mold to sag.”

## Older Mold Lock Designs Often Flawed

One of the main reasons why manufacturers are experiencing so many problems with mold locks is because today’s locks are based on the same design as those introduced more than 20 years ago. The original design was inefficient, flawed, and because many manufacturers are reluctant to change, the problems resulting from these legacy locks have endured.

With older locking systems, the mold halves must rely on the leader pins to align perfectly parallel to ensure a proper lock engagement. If there is even a fraction of a misalignment angle, often unnoticeable when the molding machine is busy cranking out parts, the resulting parts will end up in the scrap pile, or the mold machine will stall.

Manufacturers have tried to fix this problem with needle bearing systems, but this only partially solves the problem. While these systems do improve initial engagement, the small needles reduce the lockup side-load, due to their small radial contact area. The primary reason locks are installed, is to absorb the side-loads molds are subject to. Needle bearings only provide engagement relief and very little side thrust.

## Improving a Poor Design

The innovative design of the AccuraTec Tri-Side Lock eliminates mold misalignment, alleviating many of the problems experienced by manufacturers. The new lock system has several mating/locking surfaces, and utilizes a lead-in taper with a lift radius on the female end, that engages with large rollers on the male end to provide a smooth, low-friction alignment, eliminating galling and premature failure. Straight walls with a final, triple taper lockup, provide zero clearance with up to three times more locking contact surface compared to standard industry locks. The Tri-Side Lock also allows for 30 percent longer lock engagement than traditional locks of the same size.

“The key to the Tri-Side Lock’s success is its rollers and tapered radius lead-in. Even with a large misalignment, the rollers ensure a smooth engagement and the taper final lockup for maximum accuracy and holding power, compared to locks that have a blunt lead in radius and large running clearance,” explains Klaus.

AccuraTec has designed two Tri-Side Lock styles — a rectangular and a round lock, both of which are available through their distributor, PCS Company. The round lock system was originally designed for stripper plate molds. The round locking system has a large contact area, is self-aligning and simple to design into the mold. Both the rectangular and round locking systems precisely engage when the mold halves come together.

## Key Feature Leads to Manufacturing Challenge

One of the unique features of the Tri-Side Lock is its interchangeability. Because the locks are not designed as matched pairs, any top can be alternated with any bottom, as long as they are the same size. In contrast, with other locks, the same top must be used with the same bottom each time, because of inaccuracies during the manufacturing process that force matched pairs.

While the lock’s interchangeability is a strong selling point for AccuraTec, it posed a significant manufacturing challenge. The company required a machine that could meet the tight tolerance demands of the locking components. After careful consideration, Klaus decided on the Makino SP43 wire EDM.

“We selected the Makino SP43 because of its tight tolerances, reliability and speed,” continues Klaus. “We are a small shop that manufactures just-in-time parts, and we can’t have any downtime as a result of machine maintenance. Orders come in and they are out the door as quickly as possible. There is no time to waste.”

Manufacturing costs were also a concern. “With EDM machines, the wire generally accounts for 40 percent of the total running costs,” states Klaus. “The SP43 uses as little wire as possible, significantly lowering our operating costs. Filters and wire last quite awhile, and we can also substantially lower costs by controlling the machine’s feed rate.”

## HEAT Technology Alleviates Additional Manufacturing Issues

In the wire EDM process, Klaus realized his design caused flushing issues during the machine process.

In addition to accuracy challenges as a result of interchangeable locking components, Tri-Side Locks have breakthrough holes that can cause flushing issues. The locks’ round geometry also contributes to flushing problems.

Klaus turned to Makino’s High-Energy Applied Technology (HEAT) to increase speed during poor flushing conditions. HEAT is a new technology developed by Makino engineers that provides some of the fastest cutting rates and operating speeds available in wire EDM production. This high-accuracy application is possible even with standard 0.010 inch brass wire.

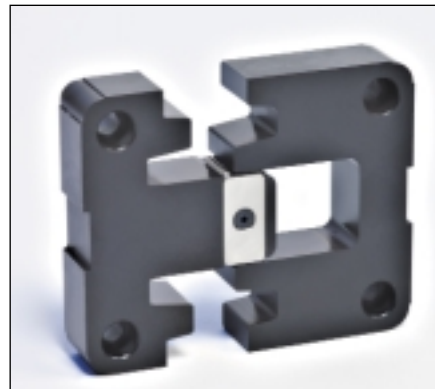
Using 0.010- or 0.012-inch-diameter wire, HEAT can achieve part straightness of 0.0003 inches per side in one-pass machining, and 0.0001 inches with two passes. Accuracies of 0.0005 inches can be achieved with one pass, and 0.0003 inches with two passes.

“HEAT increased our speed by at least 25 percent by reducing skim passes from three to two, while maintaining accuracy,” says Klaus.

## Comparing the SP43 to the Competition

Klaus fixes poor designs and flaws for a living, so it was no surprise that he scrutinized his EDM decision, closely comparing how the Makino stacked up to other wire EDMs. Several features elevated the SP43 above its competitors, including its V-type wire guide, which improves wire threading accuracy and reliability, as well as the machine’s programmable auto-threading unit that has a 15-second thread time. The estimating program, which helps Klaus calculate job time and costs, was also helpful. The SP43’s EZ-Cut feature was also a significant benefit. It lets users easily increase or decrease the cutting speed on-the-fly, to find the maximum point for cutting, without having to stop and change parameters.

“The controls were very intuitive,” continues Klaus. “My assistant, Christopher, and I had the machine up and running on the first day, before any formal training.” Christopher Listle is Klaus’ nephew, and is learning the machining trade from Klaus. He runs the machine most days, and does nearly all of AccuraTec’s CAD work.



Klaus acknowledged that financing and customer support also factored heavily into his purchase decision.

“Makino service and support was unbelievable,” reveals Klaus. “It was refreshing to be able to reach a live English-speaking human being, even on a Saturday afternoon. Makino support is available when you need it the most.”

## Up and Running

Klaus estimates his parts run 12 to 15 hours, depending on the design, and that he runs up to 12 parts on each fixture. The components, manufactured from A2 or D2 steel, are often cut unattended at night. Klaus explains the process.

“We use pre-ground blocks that are pre-machined and heat-treated to 60-62 HRC. His SP43’s HEAT comes into play when notching the locks, as the radii on the top and bottom tend to deflect flushing. We vapor-blast to ensure a matte surface on locks made from D2 steel, while stainless locks are finished straight out of the machine with no secondary work, which are primarily the round locks.” In addition to A2, D2 and stainless steel, Klaus has also experienced 20 percent faster cut times when working with titanium, beryllium copper and other material components in the SP43.

## Changing the Way AccuraTec Conducts Business

Klaus acknowledged the SP43 has changed the way his company is able to do business.

“The SP43 has been a large part of our success,” says Klaus. “In the past, we would farm out work to job shops, but we didn’t like that we were giving over so much control to someone else. Since we now have the capabilities at our shop, turning our ideas into actual inventions is a reality. I’ve built a solid reputation as an inventor of mold products. If I farm out the work and it’s not delivered on time or is done poorly, I’ve destroyed what I’ve worked so hard for. Makino helps make sure that doesn’t happen.”

While the Tri-Side Lock was one of AccuraTec’s first products, the company has several additional products in development. As Klaus continues to change the way molds are used, Makino will continue to help him expand his business and capabilities.

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