

A PERFECT FIT

IMPROVED PRODUCT QUALITY AND ENHANCED
ON-TIME DELIVERY FOR MINNESOTA MANUFACTURER

Mold-Tech, Inc. in Albertville, Minnesota, has always employed leading-edge technology in order to meet the changing needs of their customers. It is their competitive edge.



“Mold-Tech is continuously changing; we are always trying to make a better process for our clients,” says Jon Lee, vice-president of Mold-Tech. “We keep advancing so we always stay ahead.”

Staying ahead translates to endless possibilities for Mold-Tech. Acquiring the latest technology has helped Mold-Tech in their company’s expansion. They are working out of a new 12,000 square-foot facility, with double the manufacturing and engineering space of their old plant. And, they are poised to accommodate future growth.

Recently, Mold-Tech wanted to add

We had been cutting a part in another machine that was a year old—supposedly the latest and greatest. But it wasn’t able to finish cutting the part after 35 hours. We put that same part in the Makino V33 and we cut it successfully in 24 hours. This was a significant savings of 31 percent.

even more capability. They looked to Makino to help them with these goals because of past successes with Makino machines.

“Mold-Tech’s general manager Pete Parks and I went to our Makino distributor, Productivity, Inc.,” says Lee. “We visited with some of the Makino application engineers – showing them our part. They immediately did test cuts for us on the Makino V33 high-speed CNC vertical machining center. We were really impressed.

“We put the V33 on our floor and we were up and running, cutting parts in less than two days. There were no problems getting the machine operating right away.”

Immediately, Mold-Tech saw the results they desired.

A HISTORY OF EXCELLENCE Since 1978, Mold-Tech has been building the highest quality plastic injection molds for

the medical, automotive, packaging, electronics and consumer industries. They also design and build custom tooling and automation for the molding industry. Some of the products produced with their molds include water filters, cellular phone cases, fasteners, connectors and laminated bobbins.

“Our specialty is close tolerance, multi-cavity, complex high-performance tooling for the injection molding industry,” says Lee. “Our customers are a good mix of high-end custom molders and OEM’s who need and value the quality, delivery and service that they get from us.

“We build a lot of hot runner multi-cavity, multi-shot, MIM, auto unscrewing, shuttle, insert and appliqué or in-mold decorated molds. We are known for building our molds to the numbers, and having a repeatable process with cavity-to-cavity and mold-to-mold consistency.”

Their results have been excellent. “Our on-time delivery rate has been 99 percent or better over the last five years,” says Lee.

This impressive on-time delivery rate has helped stimulate Mold-Tech’s growth. While they are a small business with 30 employees operating two shifts, over the last five years they have seen growth of 10-15 percent each year with sales now over \$5 million.

In 1999, Mold-Tech became ISO 9001 certified. “That’s helped us a lot with improving our processes, and getting standards and procedures established for consistency,” says Lee. “We have a

company culture of continual improvement. We encourage new ideas and methods and try to continually improve and stay competitive.”

PROVEN SUCCESS Mold-Tech already had a Makino EDNC43 and an EDGE2, both Ram EDM machines they purchased respectively in 1994 and 1999, prior to acquiring the V33. In 1999, Mold-Tech also purchased a Makino SNC64 high-speed graphite milling machine.

“Purchasing the first Makino EDNC43 Ram EDM machine in 1994 was one of the most important decisions we’ve made,” says Lee. “Before that, we had other brands of machines in our shop. We ran three of them with three operators. But we got rid of those three machines and three operators and replaced them with one Makino EDNC43S Ram EDM machine and one part-time operator – and we did double the work.”

“That was a huge deal for our company. Mold-Tech was immediately taken to that next level of performance with that one piece of equipment! We learned back then that if you buy a piece of equipment from Makino they are going to help you be successful,” says Lee. “They are not going to put the machine on your floor, wave goodbye to you and send you a note in six months.

“Up to that point we had always purchased machinery that was middle of the road – not really high-end equipment. When we made that change we did pay more money, but Makino proved to us that you get what you pay for; and there are some big advantages. We are pleased with the people behind the machines.”

SEEKING CONTINUOUS IMPROVEMENT

That history, along with Mold-Tech’s goals for improvement and added capability, brought them back to Makino with the V33 purchase. While looking to add capability, Mold-Tech also had goals to enhance several other areas.

Many of the parts Mold-Tech cuts on the V33 have been micro-devices for the medical industry. They wanted to achieve better surface finishes on their molds, eliminating the need for polishing details that were too small for bench work. They also wanted to improve overall cycle times.

“If we could reduce the amount of time the part is in the machine, we could shorten lead times to the customers and stay more competitive,” says Lee. “We also wanted to improve cutter life. When you are spending \$5,000-6,000 per project for end mills, you want them to last a while.

“We use the Makino V33 for hard milling mold components where we are cutting finished cavities and/or shutoffs. We’re mostly doing things with tight detail and tolerances—like miniature molds requiring fine finishes.”

Like on the test part Makino produced for them, the V33 has significantly improved overall surface finishes.

“We are eliminating the EDMing and the polishing. We are cutting right to finish sizes, with accuracies to two-ten thousandths or less. Parts come out that do not need polishing,” says Lee.

HARD MILLING RESULTS On the V33, Mold-Tech has been cutting an average of 54-56 Rockwell steels. Some are M2 type materials. Most are normal mold tool steels: S-7, H13, A2 or 420 stainless. All come out smooth.

“With the V33 we can now design and build a mold around advanced hard milling techniques, eliminating, in a lot of cases, the electrode manufacturing, EDMing and polishing,” says Lee. “The better finishes translate to shorter lead times, making us more competitive.”

“The machine has really helped us in changing our processes,” says Lee. “We used to manually surface grind a lot of things to size. That would require an operator

standing at the machine for a day or two. Now we can eliminate a lot of time out of the job by milling it on the V33. We can put it in and machine it with a lot of detail. It’s changed our processes dramatically.”

The extreme accuracy and repeatability of the V33 have really stood out and impressed Mold-Tech.

“We’ve found that if we program something to cut to a certain depth on a certain location, it’s going to be there,” says Lee. “That is such a huge advantage when you only have one chance at making a part. It builds the level of confidence that the machine operator can push the button and feel like he knows it is going to come off the machine right.”

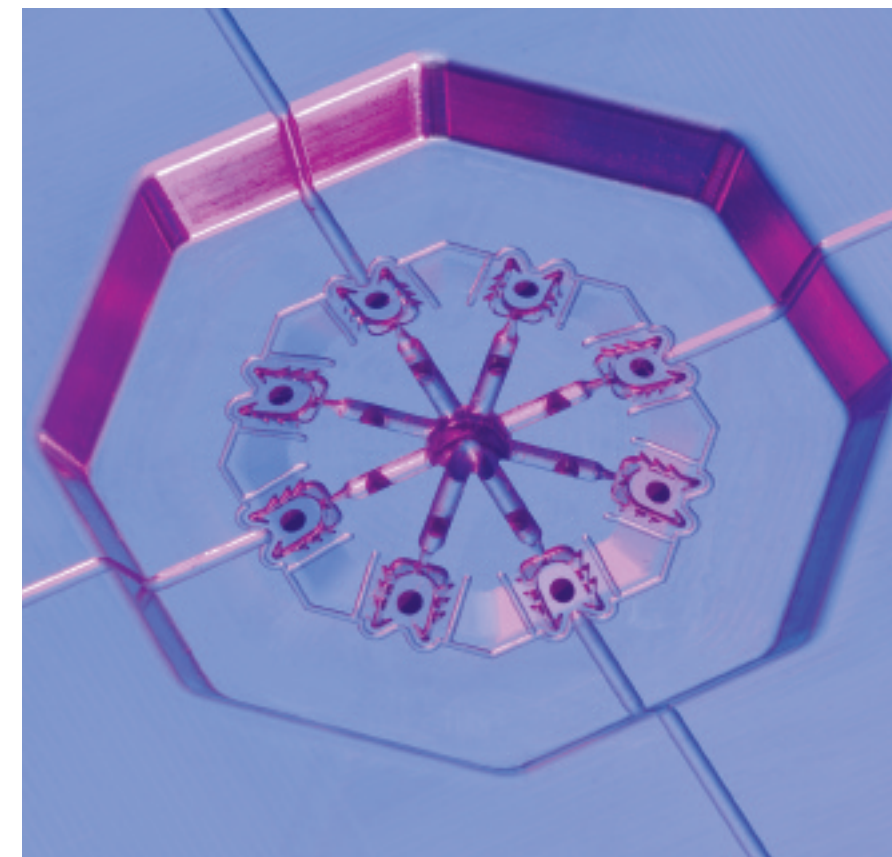
NEW POSSIBILITIES “The biggest thing that the V33 has done for us is open up a whole new realm of possibilities – we’re doing things that we’ve wanted to do for a while but have not been able to do. I know now that I can go in and machine certain parts, whereas before I would have to plan on making electrodes and burning them; now I can machine something to four-thousandths radius. I don’t have to make electrodes and burn it. I can machine without polishing.

“This allows me to bring more work into my company because we can be more competitive. We are not giving up any quality, surface finish or tool life. If anything, we are improving the quality of the product,” says Lee.

The fine finishes achieved with the Makino V33 have also enhanced Mold-Tech’s ability to do repeat work.

“One of the things that the Makino V33 has allowed us to enhance is the repeatable process so we can build mold components the same way every time, versus previously where there might have been some bench work or hand work,” says Lee.

“Now we can put the part in the machine, take it out of the machine, put it in the mold, and it fits and it’s done. If the customer needs a replacement part three



months later, we can make that same part without having the mold here to fit it to.

“We cut it, ship it to the customer and they put in the mold – with a perfect fit. We have several times built multiple molds of the same product. The biggest thing is consistency – we’re taking the hand work out of it and are making replacement parts for customers without needing the tool here.”

REDUCTIONS AND IMPROVEMENTS

Mold-Tech has found the V33 works faster and more accurately, meeting their goal of reduced cycle times.

“There was an instance where we had been cutting a part in another machine that was a year old – supposedly the latest and greatest,” says Lee. “But it wasn’t able to finish cutting the part after 35 hours. We put that same part in the Makino V33 and we cut it successfully in 24 hours. This was a significant savings of 31 percent.”

“To us, lean manufacturing means working as smart and efficiently as we can. By having the V33, we can eliminate several processes in the mold building project.”

“And that elimination of processes has had the biggest impact – translating to

a reduction in costs and lead times, making Mold-Tech more valuable to our customers,” Lee adds.

“Eliminating processes like EDMing and polishing has allowed us to meet our delivery dates and also shortens lead times. Typical lead times in the past have been eight to 12 weeks. With the addition of the Makino V33 and with some other changes in processes, we have been able to cut that down to a six to eight week lead-time, depending on the complexity of the job. In some cases, we’ve cut it to just four weeks. That is huge.”

HARD MILLING VERSUS EDMING

One of the parts Mold-Tech has machined using the V33 demonstrates their hard milling capabilities. It is a single cavity mold for a medical part that has many features that would traditionally be EDMed and then polished. Now they are able to mill the entire cavity block – the parting line, the telescoping parting line, the shutoffs, the molding detail – with the V33.

Mold-Tech used 420 stainless steel (52-54 Rockwell) and held it to an accuracy of two ten-thousandths, with a surface finish they don’t have to polish. They are using end mills down to 0.2 mm in diameter, or eight-thousandths.

Overall, Mold-Tech is seeing a difference with the V33 – they are doing things they would have not been capable of in the past. “There are a couple instances where we were able to design a mold completely around our hard milling capabilities,” says Lee.

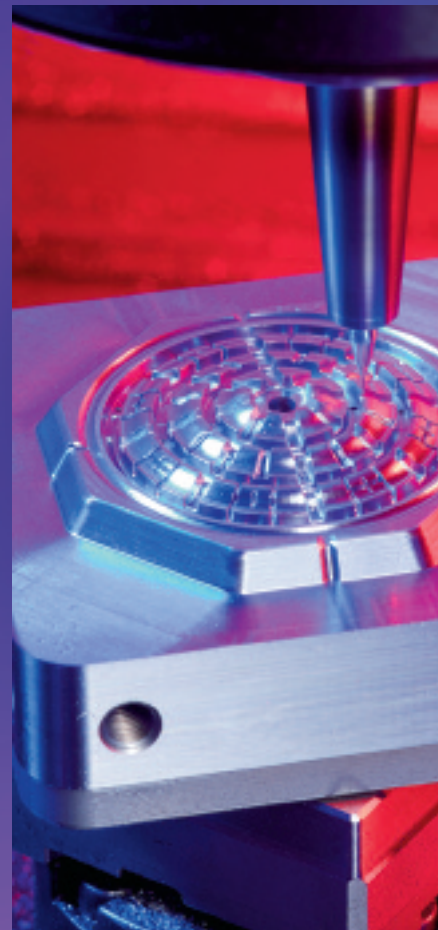
“On a medical device we were able to entirely hard mill the whole project, versus EDMing it. And we got a much more repeatable process. We can reproduce these parts very accurately with unattended machining. You put the block in, the

program is loaded, the tooling is setup, you push go and it comes out finished on the other side.

“We were able to see a big time savings on that particular project. We did not have to purchase the graphite or do the burning. We didn’t have to do polishing or jig grinding. We were able to machine it completely, building this project in nine weeks where traditionally that would have been a 12-14 week project.”

“We got the job because we could make the nine-week delivery,” says Lee. “The customer couldn’t believe it could be done with as much detail as was on that part.”

“We have also had several large automotive tools that are multi-cavity, with many actions in them – lifters, slides, etc. We’ve been able to incorporate the hard milling process into the components themselves where a lot of things typically would have had to be burned or EDMed. In many cases there is no polishing. It’s been a big asset to be able to produce these molds in the timeline that we are given.”



“One of the things that our company is known for is our customer service and our quick turn around. When we say we will meet a certain date, we do it. The V33 helps us back up our 99 percent on-time delivery rate,” says Lee.

The V33 has also helped Mold-Tech save money on tools, their third objective sought in buying this machine.

“There is less stress on the tool and they run longer,” says Lee. “We put a tool in the V33 and it runs for 8-10 hours, versus 2-3 hours on our other equipment. We are getting many times the tool life out of the machine. And we feel this all comes back to the design of the machine – the rigidity and the core-cooled spindle.

“It’s hard to put a percentage on the amount of money we are saving. But I know we are spending a lot less on end mills than we were previously. It is significant.”

RETURN ON INVESTMENT To ensure such success, Lee says Mold-Tech has several criteria they follow when purchasing equipment.

“It comes down to several things. First, what is the capability of the specific machine tool – is it going to be able to do what we want? Next, we ask how quickly can we see return on investment. That one is hard to quantify, but if we buy a piece of equipment to do something we can’t do, and it is able to do something we need it to, it’s easy to see it will pay for itself fairly quickly.”

“Lastly, we look at who is selling the machine – what kind of support we’re going to get if things don’t work right,” adds Lee. “If the machine has a problem, are they going to be there to fix it? Are they able to support you when things aren’t going well?”

“When we buy a piece of equipment, we plan on running it for quite a while. What we then do is add new capabilities to that equipment. When we see new technology that is going to enhance our capabilities, that’s when we buy it.”



Eliminating processes like EDMing and polishing has allowed us to shorten complex job lead times from 6-8 weeks down to four.

The return that Mold-Tech has seen from their investment in the V33 was immediate.

“In general, it was much easier for us to see the return with the V33 because it did exactly what we wanted it to do. It allowed us to change our processes and reduce time on the job,” says Lee.

“With our investment in technology we haven’t eliminated positions; they have simply migrated into other areas. We now have more people working behind computers. Years ago we had three people in the entire office and 25 people in the shop. Now it’s a 50/50 mix. With that mix, we are able to do a lot more volume.”

MAKING AN INVESTMENT “When we bought our first Makino EDM machine

back in 1994, it was a very expensive purchase for us at the time,” says Lee. “It was scary. Previously we would have bought something a lot cheaper than that and lived with the lesser capabilities. But we learned that while it’s scary to spend that much money on a machine, once we saw the capabilities we knew that it was the best thing we ever did.”

“Yes, you can purchase a machine tool from a company that has a lesser price, but it’s probably going to have fewer capabilities, and in the end you will not be happy with it. You’ll probably replace it quicker because it doesn’t do what you wanted,” Lee adds. “It’s happened to us.”

“When we buy a new piece of equipment we ask, what kind of benefits is the machine going to bring us? Will

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WORKING SMARTER



At the 2006 International Manufacturing Technology Show this September, Mold-Tech will work with Makino to demonstrate capabilities once thought impossible. They are making a prototype part to demonstrate how companies can work smarter.

“It is a fictional part, for proprietary reasons, but we’ll call it a hybrid staple for the medical industry,” says Lee.

“It’s made in 420 stainless steel at about 52-54 Rockwell. It’s a little eight-cavity mold with extremely tight detail. In the past it would not be considered for milling.”

Mold-Tech will mill the part on the Makino V22 vertical machining center.

“The finishes will be adequate so that we do not have to do any polishing, because the detail is so small it would be impossible,” says Lee. “The radiuses will be down to three-one thousandths, and we

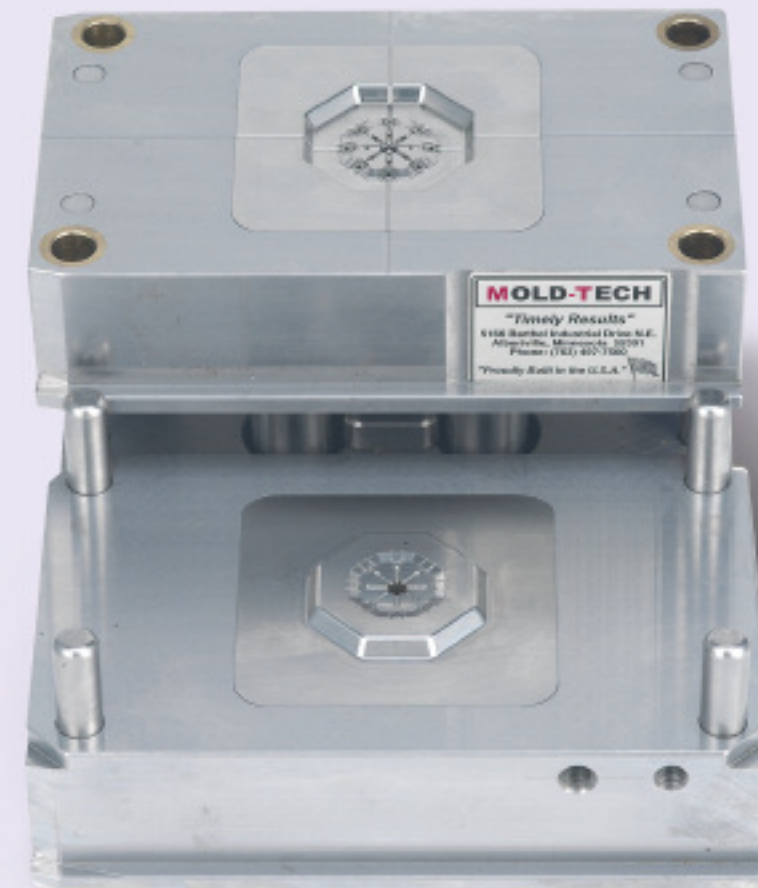
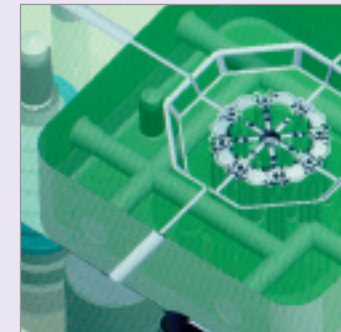
are cutting with a six one-thousandths diameter end mill.

“Once people can see these capabilities, they, too, will want to design their parts to eliminate sharp corners and put smaller radiuses in there, saving time and money down the road on their own projects.

“This goes all the way upstream to the part design and tool design. We now design a tool around certain capabilities that will allow us to do the mold quicker and more cost effectively, without giving up any quality or robustness on the part.

“A lot of times we get a part from a customer and the first thing we do is look at where we can take dollars out of the project if we allow geometry changes in certain areas,” says Lee. “Our customers are becoming more and more receptive to those types of requests for changes, knowing that it’s going to help them in the long run.

“This is another reason we’ve been successful and hope to continue to be successful in the future – we are helping our customers do things quicker and better than other people around the world.”



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it improve our processes? And, is there someone there who can help us, or is this just someone who is interested in selling us a piece of equipment? We’ve learned that you have to somewhat overlook the initial price when you weigh the support you are going to get from the company.”

The people behind the machine are reinforced through Makino’s Tech Transfer program. Mold-Tech has taken advantage of Makino Tech Transfer classes. Several of their people have attended and have worked with Makino’s application engineers to come up with solutions on certain projects where they are having problems.

CUSTOMER SUCCESS “Within the last year or so, we feel that the cutting tools, software and machine tooling have all come together and we’ve been able to go where we wanted to,” says Lee. “We feel at this point we are only scratching the surface of the Makino machining capabilities. We are still learning how far we can take it.

“We are optimistic about the future of our company and industry as long as we continue to work smarter and more efficiently.”

“Mold-Tech is extremely happy with the level of support and technology that Makino has been able to provide us with,” says Lee. “We really feel that we have a partner, and I am sure that when we buy more equipment that we will definitely be looking at the Makino machines.”

It seems Makino has certainly been a perfect fit for Mold-Tech. **101**

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