



# Custom Valve

Controlled Flow



User Story

Michigan valve producer and job shop embraces smart manufacturing in its quest for continued growth, efficiency, and competitiveness. VERICUT toolpath simulation and optimisation software from CGTech is part of that equation.

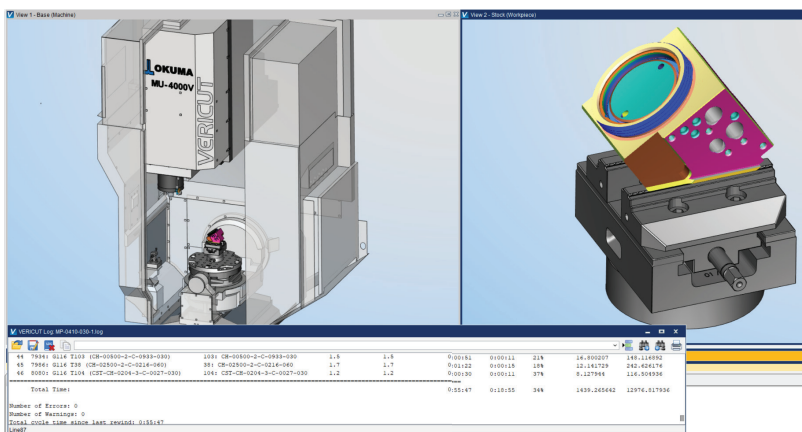
The Challenge: Staying ahead in an increasingly tight labor market and competitive manufacturing landscape.

The Solution: Assume the mindset, “We’re always looking for new technology that will make our processes more efficient and our company more successful.”

Some good ideas are meant to last; some just keep getting better. So it is with the Kates Flow Rate Controller, invented in 1957 by Chicago toolmaker Willard Kates. Since then, his original design has enjoyed continual improvement and is now found in everything from the robotic spray lines used to paint the family car to fluid blending and batching systems, high-pressure hydrogen gas facilities, semiconductor processing equipment, and English Muffin-making machinery.



Kates sold his valve design and manufacturing company to Frank A. Taube II in 1984, who later moved the operation to its current home in Madison Heights, Michigan. Today, it's owned by son John Taube and his wife Susan, company president, who changed the name to Custom Valve Concepts (CVC) in 2005. And while the Kates Flow Control Valve remains a “core product” at this 70-year-old manufacturing firm, CVC and its team of 40+ machinists, engineers, and support staff provide a range of services, industrial design and precision machining among them.



## Meet the New Guy

Manufacturing technology manager Vitaliy Tsisyk is a member of this team, and is quite proud of the self-adjusting valve’s long and successful history. “It’s a unique product,” he says. “We design



them, we manufacture and test them, and we ship them all over the world for use in countless applications. And they work.” He laughs. “We’ve had customers send us units they bought more than thirty years ago, and when we ask them what’s wrong, the answer is “Nothing, we just figured it’s time for some maintenance.”



Given CVC’s many years in business, Mr. Tsiyuk is a relative newcomer. He came on board in early 2021, and in an effort to increase growth and plant floor efficiency, he soon began introducing some advanced technologies. One of these is

a software product he successfully pushed for at his previous job with BMT Aerospace, a large gearbox manufacturer in nearby Fraser, Mich.

“BMT Aerospace bought VERICUT to avoid crashes on a high-accuracy DIXI five-axis horizontal from DMG MORI,” says Vitaliy. “I took one look at that machine and told management we needed to invest in toolpath simulation and optimisation software. Its use soon expanded to other machines, though, especially in the five-axis machining area. I quickly learned that no shop should be without it.”

The story is much the same at CVC, which boasts a similarly impressive equipment lineup. These include five-axis machining centers from Mazak, Okuma and Hardinge brand mill-turn lathes with Y-axis, Swiss-style turning centers, and various other CNC machinery, many equipped with Renishaw probing systems and glass scales for increased accuracy. This allows them to tackle a wide variety of complex parts and an eclectic mix of materials, from Hastelloy and Stellite to Delrin, PVC, and PEEK.

### Better Visualisation

They’ve also taken the first step into the additive world with a 3D printer from Markforged, part of its involvement in Automation Alley’s Project DIAMOND initiative “dedicated to improving manufacturers’ agility and resiliency by helping them scale up their Industry 4.0 activity.”

Tsiyuk is all in on anything related to Industry 4.0, although he’s quick to point out that the printer was initially brought in to address the shortage of PPE and ventilator parts during the pandemic. Thankfully, it’s now used for far less urgent needs, such as printing fixtures, soft jaws, robotic grippers, and surrogate parts for program validation.

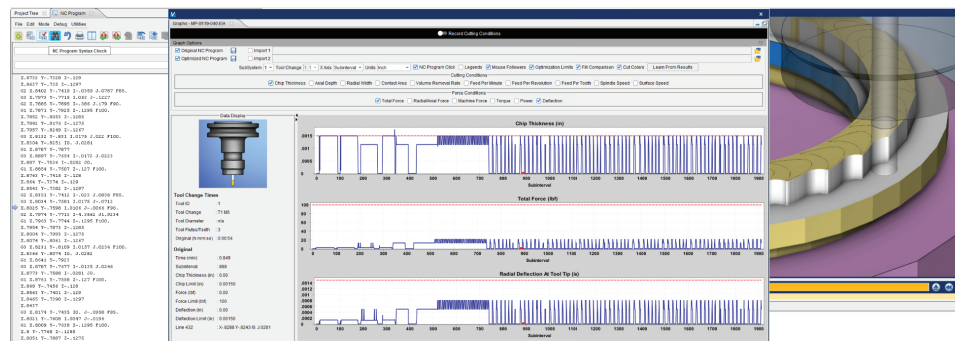
“This last use might seem like a luxury, but even with a good CAM system, it’s nice to have a physical part in your hand,” he says. “It helps you visualise

how to process the job, what tools to use, how far they should stick out, and get input from others. It also helps the quality department to plan its workholding and measurement equipment needs.”

It's VERICUT that has had the greatest impact on shop floor operations, however. Shortly after purchasing the software and well before its widespread use, CVC began working on some complex prototype orders. Vitaliy explains that, by utilising their conversational programming capabilities, they are usually successful in meeting short-run demand like this, but this time they ran into problems with part quality and tool life while machining a small, deep pocket within the workpiece.

After “hours and hours” of lost time, they even sent the program to the machine builder's application team, to no avail. “They tweaked a few things and sent it back to us, but it was no good. The job called for a 0.045" end mill, and no matter what we tried, it would gouge the part and break a tool.”

Although VERICUT was not yet fully implemented, Vitaliy and the machinist got together to tackle the challenge. After a quick review of what worked and didn't, they determined that the cutting parameters chosen by the conversational control were overly conservative. They decided to optimise the program via Force. ““The results were stunning!” he says. “The part was done and of high quality, the cutting tool was still intact, and there was no more gouging. Like many veteran machinists and programmers, my colleague was skeptical when we first bought VERICUT, but this event made him a believer.”



That attitude is not unusual, Vitaliy adds. It's always a challenge to introduce new technology, especially with the more experienced people who have significant programming skill, he says. “Everybody has their own ideas on the best way to process a part. And while we're proud of them and value their contributions, VERICUT catches things that humans can't. Once you show them that, or prevent a crash that might have cost tens of thousands of dollars, the hesitation falls away.”

### Forceful Arguments

VERICUT isn't the only new technology changing the way CVC operates. There's also Force, CGTech's “physics-based NC program optimisation

software module that analyses and optimises cutting conditions.”

His team looks forward to kicking the Force tires in a big way. “During the last seminar with CGTech, they polled the attendees, and I was surprised to see that many weren’t yet using Force,” Vitaliy says. “From my Force experience, I can tell you that on some jobs, we’re reducing our cycle times by 12 to 25 percent. But even when you only get a few percent improvement, tool life goes up significantly. It makes the process much more stable and predictable.”

Mr. Tsisyk is just getting rolling on his continuous improvement efforts. CVC has installed supply vending machines from MSC Industrial, implemented Mastercam to augment their existing GibbsCAM capabilities, and are looking forward to establishing a tool management and offline presetting strategy, probably with ZOLLER or another provider.

Says Tsisyk, “VERICUT, a robust CAM system, and offline presetting with barcoding. Bam, that’s it! You now have a closed-loop system. That’s our future path, but we haven’t yet pulled the trigger because we’re taking small steps and know that we need to finish one project before jumping another one. But at the same time, it’s really needed. Tool management is huge. It’s something that companies lose a lot of money on because they don’t know. It’s an unknown factor.”

What’s well-known known is the fact that VERICUT is having a significant impact on CVC’s efficiency. “We look forward to continued growth, but in order to handle that effectively, you need to have robust, repeatable processes. And for that, you need strong systems that our people can have confidence in. So yes, there’s still a lot of work left, but for now, I feel comfortable knowing that we have a gouge-free, crash-free programming environment with none of the surprises that plague so many machine shops. That’s what VERICUT delivers.”

[www.customvalveconcepts.com](http://www.customvalveconcepts.com)

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