

The Mark Two Secures A Firm Grip in Robotic Automation



Comparing the Numbers

	Cost	Time
CNC Machining Service	\$290.35	72 hours + shipping time
Printed with Markforged	\$9.06	9 hours, 20 minutes

Getting a Grip

An industrial FANUC robotic arm gracefully swings from one automated machining center to another with a pipe fitting firmly gripped between its jaws. At Dixon Valve's US manufacturing facility in Chestertown, Maryland, these robotic arms are commonplace in production line cells, used for part transfers in the manufacturing process. Strength, safety, and chemical resistance are key components to Dixon Valve's efficient work environment, and as such attached to the arm of each robot is a set of Onyx jaws, printed on the Mark Two industrial strength 3D printer.

Problems at Hand:

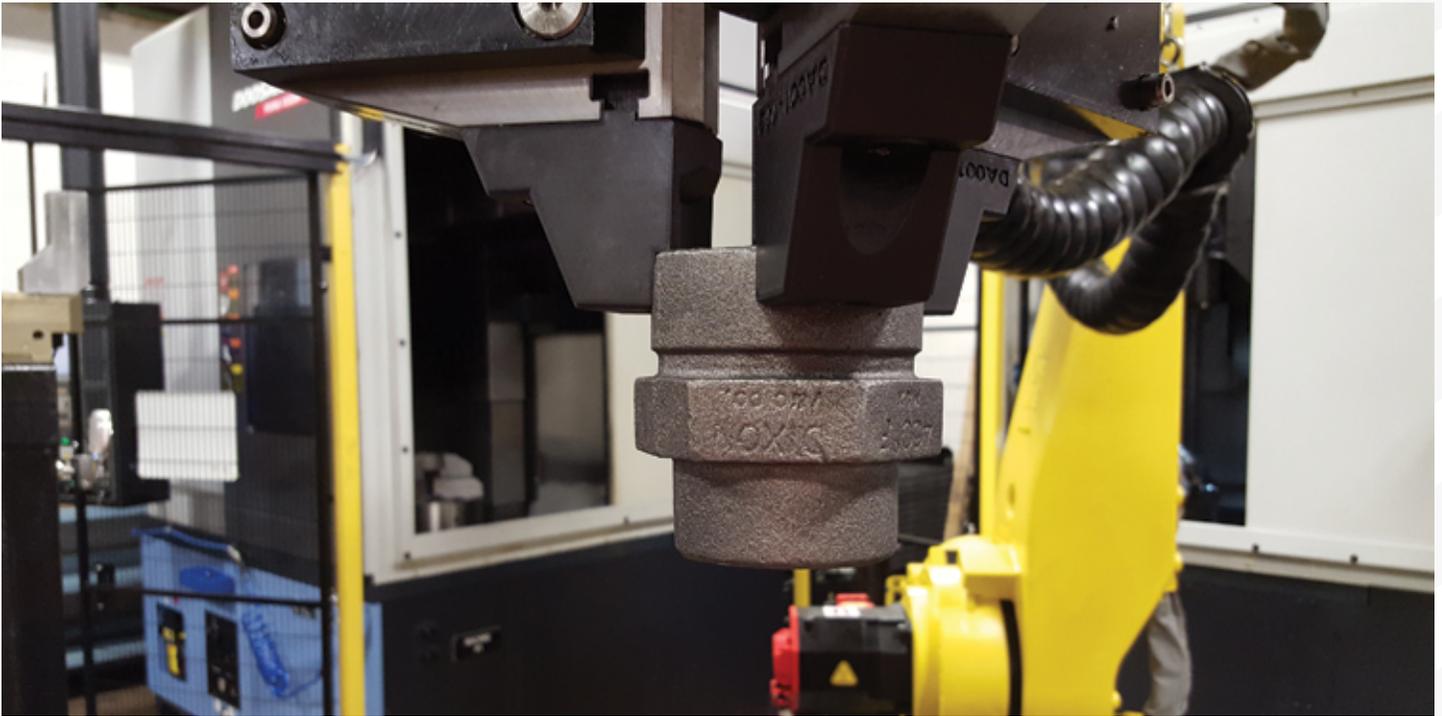
Mike de Arriz and J.R. Everett improve and expand innovative production line solutions at Dixon Valve, a fittings and valves manufacturer.

Open Arms:

de Arriz and Everett put the Mark Two to work creating high strength jaws for industrial robotic arms in their manufacturing process.

Jaw-Dropping Success:

The Mark Two Enterprise eliminated weeks of manufacturing lead time by producing a set of robust grippers in under 24 hours, allowing Dixon Valve to easily develop new production solutions.



A quick change jaw for a robotic cell. The metal plates remain fixed, and operators can rapidly change out custom Onyx jaws in just 20 seconds.

“Dixon Valve is a manufacturer of fittings for fluid transfer industries,” Max de Arriz, Manufacturing Engineer at the company, explained. “We’re using a large robotic arm to transfer many styles of our parts between two vertical turning centers.” With the thousands of different valves, fittings, and gauges that the company manufactures, each product line setup requires custom equipment, including tooling and grips to hold specific parts efficiently. De Arriz, along with Automation Technician J.R.Everett, reap the benefits of their Mark Two in Dixon’s production facility.

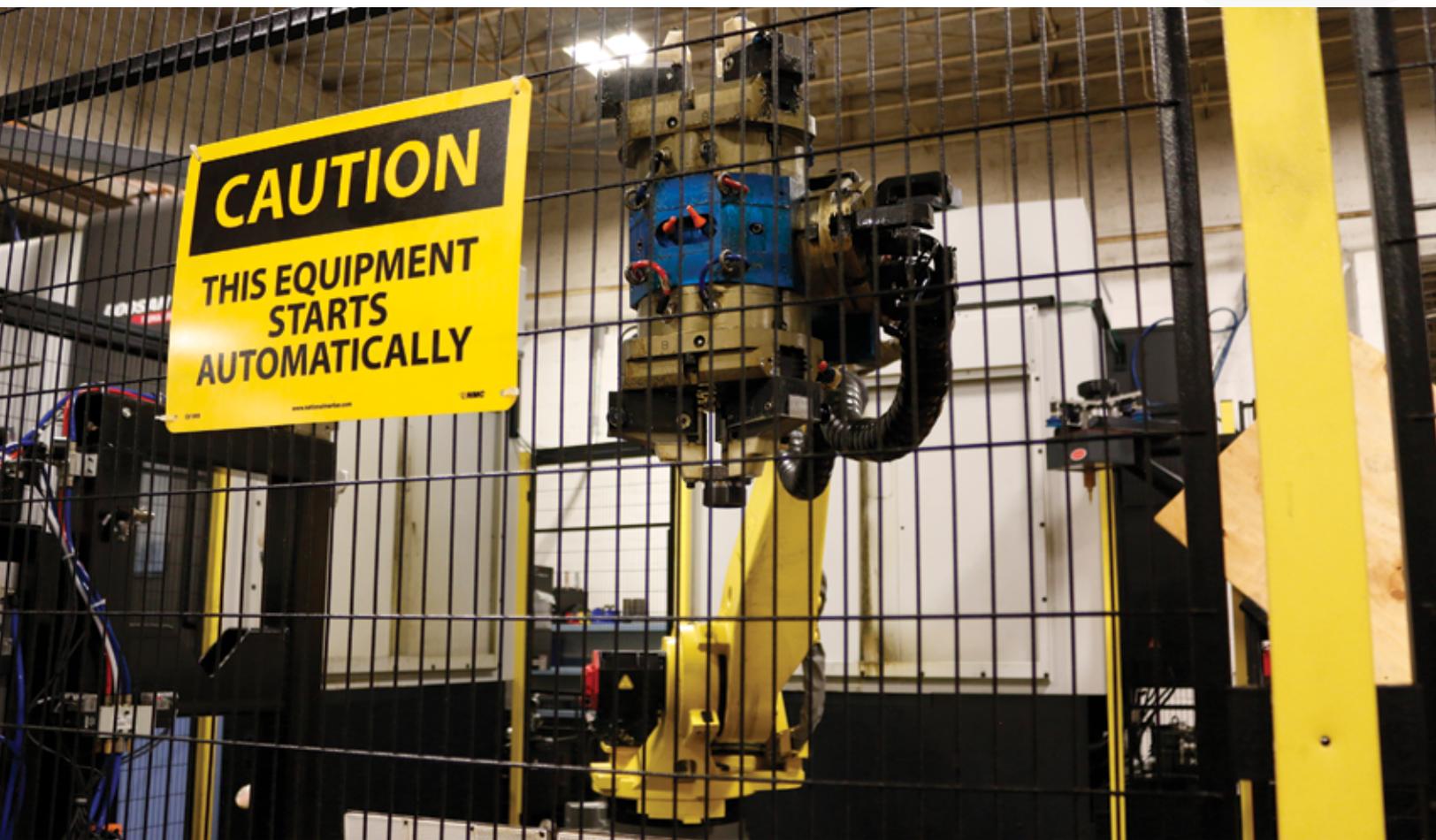
“With Onyx we were able to re-tool a robotic arm in a manufacturing cell in under 24 hours.”

Within Arm’s Reach:

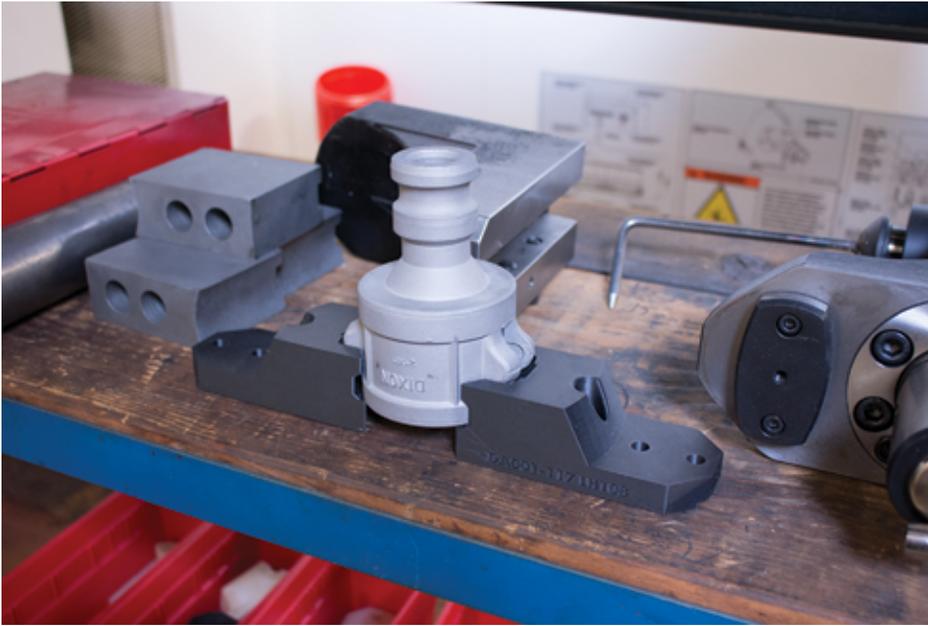
“Prior to using 3D printed jaws in the cell, we were machining each tool individually, and it would take a fairly large amount of time,” de Arriz explained. Every gripping tool needed to be either outsourced to an external machine shop or machined in house with the manufacturing capabilities at hand. Either way, manufacturing parts as critical as production line grippers was getting time consuming. As Dixon primarily produces valves and fittings, these grippers also require strength and chemical resistance, as well as wear resistance from repeated use. “To that end, we utilize the Markforged parts as our transfer gripping system,” de Arriz concluded.

As soon as Dixon Valve unboxed their industrial strength Markforged 3D printer, they put it to work. “We were able to re-tool a robotic arm in a manufacturing cell in under 24 hours,” Everett exclaimed. The Mark Two not only allowed for the production of their robotic jaws quickly, but the material capabilities of the printer, including its ability to lay continuous strands of high-strength fibers into 3D printed parts, ensured reliability in a factory setting. “Onyx is one of my favorite materials because it combines stronger composite material with the chemical resistivity of nylon,” elaborated Everett, referring to Markforged’s chopped carbon fiber nylon filament. “It hits the sweet spot for us in chemical resistance and strength.”

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A robotic arm with 3D printed grippers working on the Dixon Valve factory floor. A new set of jaws can be made on the Mark Two in less than a day.



Dixon Valve uses their Mark Two Enterprise Kit to easily manufacture jaws and tooling for valve and fitting production.

Hand in Hand

The Mark Two enabled Dixon Valve to produce new manufacturing solutions at unprecedented speed and cost, providing the company with a powerful new tool in their toolbox. "It's a critical component in our design process and it is really changing the way we work to the point where we are actually altering our procedures and plans to accommodate this groundbreaking product," says Everett. By incorporating the printer into the company's workflow, Dixon Valve was able to expand and improve even further, and they don't plan to stop there. The ability to produce parts with esteemed strength, quality, and precision at a low cost gives Everett high hopes for Dixon's path forward: "If I had to tell somebody on the street what's great about this product, or what is great about Onyx, or what the coolest thing is to get out of it, I'd say it's your imagination. If you can think of it, you can create it."

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Markforged's mission is to bring high strength 3D printing to everyday engineering. Offering the world's only 3D printing systems capable of automatically reinforcing engineering plastics to aluminum levels of performance and beyond, Markforged enables every business to easily manufacture parts with structural strength right on the desktop. The Mark Two Industrial Strength 3D Printer empowers professional users to affordably create workhorse 3D parts that solve real problems, as well as realize reinforced structures never before possible. Markforged technologies are delivered with thoughtful, powerful software designed for collaboration, sharing, and scaling.

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