

GRIPPER JAWS

CRITICAL TOOLING — These jaws mount on a robotic arm that adds sealing rings to steel couplings.

THREAD GRIPPER — Each jaw clamps outward on the threaded inner surface of the coupling.

SURFACE HARDNESS — To withstand the abrasion of sharp threads, this part must be made of metal.

MASSIVE SAVINGS — Dixon Valve achieved **30x cost savings** and **10x time savings** by printing these jaws.

The Printed Part

CONTACT SURFACE

3D printing allows engineers to easily design the contact surface for optimal gripping.

SURFACE HARDNESS

These jaws are hard enough to process thousands of stainless steel pipe couplings without wearing down.

WET SANDED

Wet sanding the part while in green state yields exceptional surface finish in 15-20 min.



A Place for Metal

Dixon Valve has long used Markforged composite 3D printers to manufacture End of Arm Tooling (EOAT) for their many robotic arms. However, they could not print grippers that held abrasive surfaces. The threads these grippers hold quickly wear out printed composite parts, which while strong have the same surface hardness as thermoplastics. By printing the grippers with the Metal X, Dixon Valve achieves the same advantages that 3D printing affords without sacrificing part durability.

	OLD PROCESS	MARKFORGED	SAVINGS
Fabrication Time	14 days	1.25 days	91%
Fabrication Cost	\$355	\$7	98%



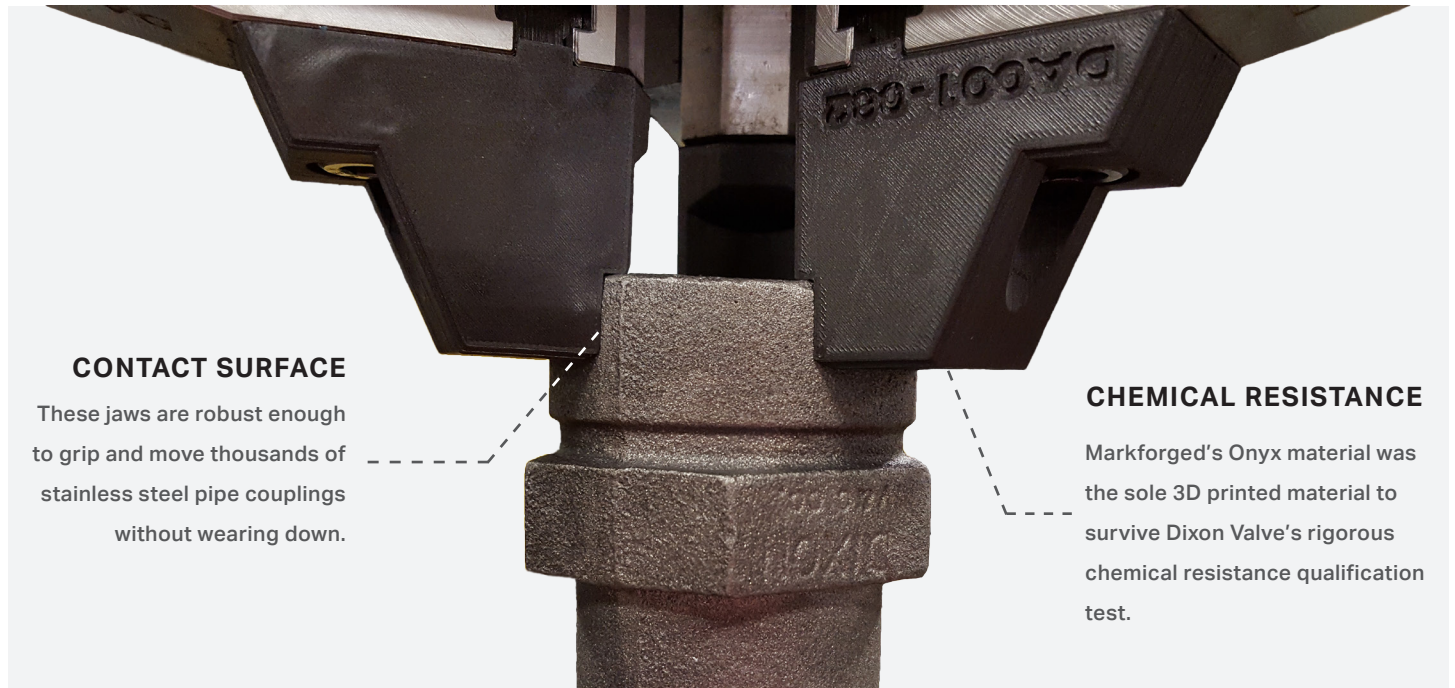
COMPOSITE JAWS

END OF ARM TOOLING — These jaws mount on a robot that transfers fittings between machining centers.

CHEMICALLY RESISTANT — Jaws must survive corrosive fluids while subjected to repeated clamping.

NEXT DAY TOOLS — With a Markforged Mark Two, Dixon Valve is able to retool a robotic arm in 24 hours.

MASSIVE SAVINGS — Dixon Valve achieved **30x cost savings** and **14x time savings** by printing these jaws.



CONTACT SURFACE

These jaws are robust enough to grip and move thousands of stainless steel pipe couplings without wearing down.

CHEMICAL RESISTANCE

Markforged's Onyx material was the sole 3D printed material to survive Dixon Valve's rigorous chemical resistance qualification test.

A New Paradigm

Markforged enabled Dixon Valve to produce new manufacturing tooling solutions faster and cheaper than ever before. System Engineer J.R. Everett describes the Markforged machines as "a critical component in our design process [that's] really changing the way we work to the point where we are actually altering our procedures and plans to accommodate it." With their Markforged machines, Dixon Valve engineers eliminated the need to outsource or machine in house the vast majority of their grippers.

	MACHINED	MARKFORGED	SAVINGS
Fabrication Time	144 hrs	9 hrs	93%
Fabrication Cost	\$290	\$9	97%

