

SAMPLE PART

END OF ARM VACUUM MANIPULATOR

- End of arm vacuum tooling (EOAT) is common in packaging and cardboard box assembling equipment
- Vacuum manipulators are an effective solution to softly and securely grip thin, flat products
- A 3D printed solution replaces external vacuum tubing that can snag, or internal channels that are difficult to machine
- Manipulators printed with Onyx and Carbon Fiber are strong and light-weight with complex, integral vacuum channels

PART FEATURES

In the packaging industry, vacuum manipulators mounted at the end of industrial robot arms are widely used to position and handle thin products such as unassembled cardboard boxes. The manipulator generally distributes a main vacuum line into a series of suction cups positioned for stable gripping across the target object. Internal vacuum routing is key to avoiding snags and jams in high speed production.

WHY MARKFORGED

Vacuum EOAT requires high stiffness to promote a good seal, and low weight to enable high speed robot arm movement. Combining Markforged’s Onyx and continuous Carbon Fiber filament enables vacuum EOAT to be created with both these properties, often exceeding the capabilities of traditional materials like aluminum. Iterating through designs for end-use EOAT is also much faster with a 3D printed solution.

INDUSTRY APPLICATIONS

Packaging equipment across the industry is often engineered as custom or semi-custom solutions produced in low volume. High strength 3D printing from Markforged offers material and process performance in excess of existing aluminum solutions and attractive economies at the low volume scales commonly seen in a packaging equipment manufacturer.



	Markforged	Off the Shelf	Improvement
PART COMPARISON			
Materials	Onyx and Carbon Fiber	Aluminum 6061	-
Tensile Strength (MPa)	700	310	126%
Density (g/cm³)	1.4	2.7	-48%
Vacuum Routing	Custom internal	External, limited internal	-