

## M.I.T Benchmark Test Flexure, 50% Size

**Date:** 3/25/2019**Part:** Flexure 50% scale**Material:** 2024 Aluminum**Machine:** DATRON neo**Workholding:** Masking tape and super glue**Software:** Autodesk Fusion 360**Tool information:**

Tool Description	Article Number	Ø	RPM (x1000)	Feed XY (inch/min)	Feed Z (inch/min)	D.O.C. (inch)	W.O.C. (inch)
Double Flute Carbide End Mill	0068005K	0.019"	38	12	5.00	0.003	0.019
Single Flute carbide End Mill	0068430A	0.118"	32	60	16.0	0.030	0.118

Operation	Cycle Time	Workholding	Notes
1	16 min 12 sec	Masking tape and super glue	

**Operation 1****Process Notes:**

The first operation was a 2d contour used to cut the profile of the internal flexure geometry using a double flute 0.5mm endmill with ethanol coolant. Ethyl alcohol, used in minimal quantities, appeared to have no negative effect on the work holding. DATRON tooling was used, which led to slightly undersized internal geometry. The internal geometry was 0.008" instead of the 0.010" as modeled due to the larger tool size being used. The last toolpath was cutting the part out with the 3mm single flute end mill.

**Opportunities for Improvement / Optimization:**

Work holding issues prevented optimization of speeds and feeds. A very shallow depth of cut and slow feed rate was required to prevent tool breakage. The cause of the tool breakage was an uneven application of the superglue underneath the masking tape. This allowed for slight movement of the workpiece during machining.

Using a better tape and a more even application of super glue would likely allow an increase to depth of cut and feed rate, reducing the cycle time of this operation.

