

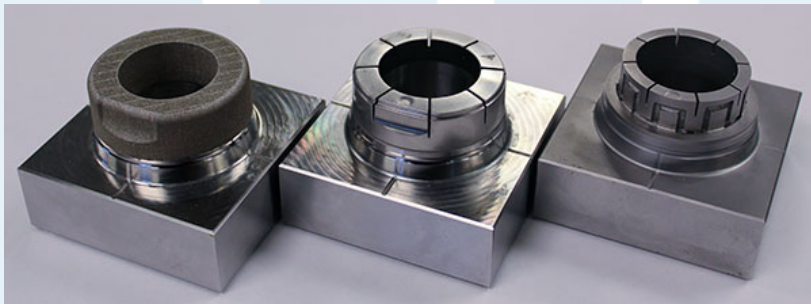
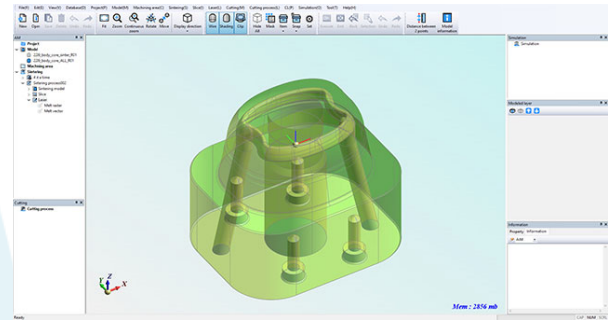
MANUFACTURING SOLUTIONS **FOCUS: ADDITIVE MANUFACTURING / 3D PRINT**

DYNAMIC TOOL is a premier Injection Mold Builder with a reputation for performance excellence - Providing innovative engineering, design, and development solutions for the optimized production of plastic components and products.

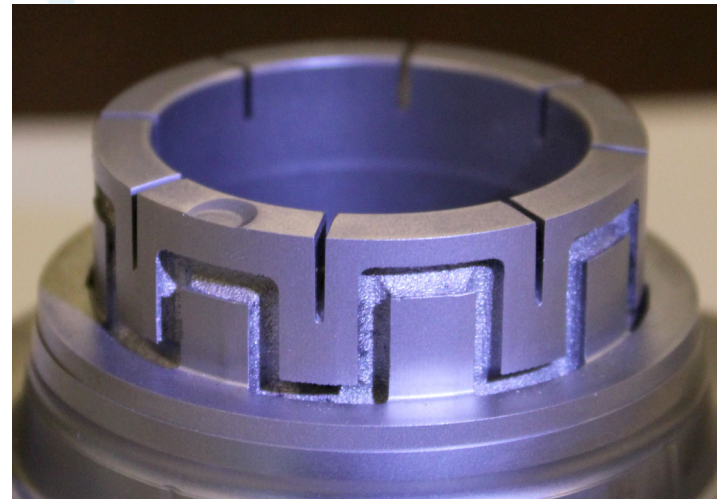
CONFORMAL COOLING

Traditional mold manufacturing processes (milling / grinding / EDM...) are augmented by 3D Print technologies - facilitating the creation of conformal cooling channels for more precise control of injection mold thermal dynamics. Using the specific geometries of part design to create the shape and placement of cooling channels provides extensive benefits:

- Increased production via shorter cycle times
- Lowers piece part cost
- Improved part dimensional stability - less warpage / shrinkage
- Improved surface finish quality
- Lower scrap rate
- Minimum thermal gradient throughout part while cooling – more uniform temperature profile



On the left is the workpiece as it comes out of the 3D Printer. The workpiece in the middle has been machine finished and is ready for assembly into the injection mold. The third example has had its exterior surface machined away to reveal the cooling channels - which would be impossible to create using conventional machining processes.



Dynamic has extensive experience and success in implementing conformal cooling design into production tooling systems, having built hundreds of cores using this technology in critical areas for enhancing thermal control.

CONFORMAL COOLING

Material is Maraging Steel - 36 Rockwell before aging / 53 Rockwell after aging

- We also have the option for printing stainless

Print area is 9"x 9"x 9", but the 2D footprint of a single part must be less than 9"x 9"

Avoids sharp corners in water channels

Surface finish dependent upon laser settings

Allows for cooling channels in areas that are not possible to achieve using traditional methods

Reduces the need for o'rings therefore reducing number of water connections

Simplifies mold designs

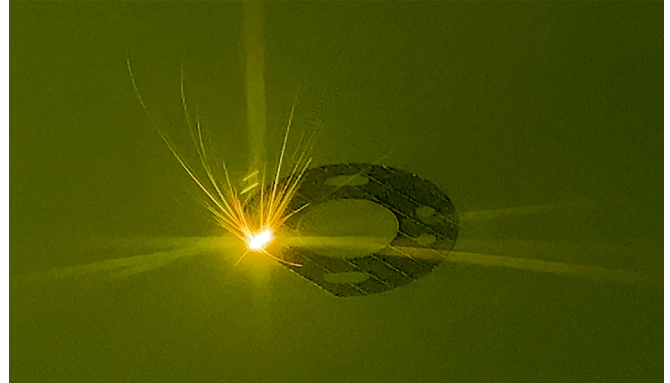
Expands part design innovation opportunities

Surface finishes on printed steel can be textured or polished up to a diamond finish

Flexibility / additional options of water channel shapes and placement - No longer locked into traditional 2-dimensional drilled water lines with their sharp corners

Prototyping capabilities - for 3D printed injection mold components

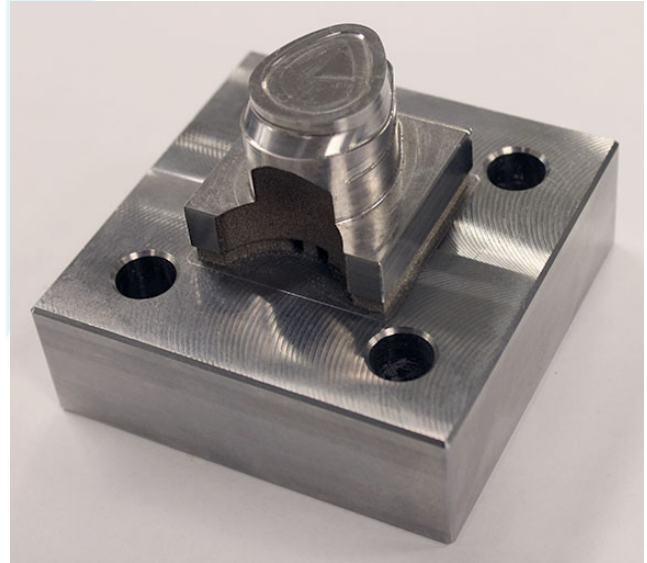
PRINT SIZE	ACCURACY
~50mm	±0.01mm
50mm - ~100mm	±0.02mm - ~0.03mm
>~100mm	±0.03mm - ~0.05mm



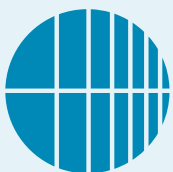
Each layer is .04mm (.00157 in) thick



SODICK OPM250L combines industry-leading laser sintering technology with high-speed milling to print and finish a product in one automated operation.



Dynamic Tool's additive manufacturing technologies can also be used for the manufacture of injection mold components - facilitating the creation of prototype and developmental tooling systems.



DYNAMIC
TOOL CORPORATION

Dynamic Tool Corporation
W133N5180 Campbell Drive
Menomonee Falls, Wisconsin 53051
262-783-6340
www.dyntool.com