Fused Filament Fabrication (FFF)
Printer Guidance

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What does an open FFF 3D printer cost?

The cost of open materials FFF 3D Printers ranges from $2,500 - $500,000

Most desktop models are in the $2,000 - $10,000 range

Ultimaker MakerBot LULZBOT

Machines that print higher temperature materials like PEI or PEEK or even PA6 and PC are in the $15,000 - $50,000 range

aon3D Roboze INTAMSYS

Closed platform machines are $100K and up and only run proprietary materials.

- Pro: closed platform machines are reliable and have higher throughput when compared to many lower cost printers.
- Closed platform machines are expensive and their proprietary materials are 2-5x more then those used by open systems.

Value Prop for 3D Printing Jigs, Fixtures, and Tooling

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COST – 80%

Lower cost than traditional machining

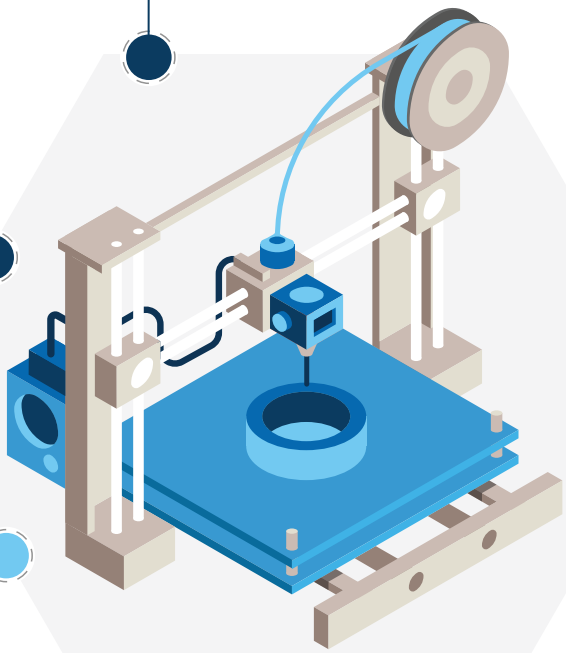
SPEED

80% Faster turnaround than machined tooling when using outsourced vendor

IMPROVED

Improved efficiency through scrap reductions

- Less scratch and mar than metals
- Better fit in fixtures
- Lighter weight
- Quickly iterate on tooling designs and have optimal tooling for better production



ENVIRONMENT

Health and Safety Support – Improved employee health and safety

- Lighter weight fixtures
- The ability to quickly address issues

ENABLES

Lean Manufacturing

- A natural fit for 5S nesting and fixturing
- Make manual processes more efficient
- Operators and technicians provide direct input on improvements

BETTER

Utilization of limited tool room resources

The ease of 3D Printing

- 3D Printing with FFF is low-cost vs. machining
- Creative designs unlock possibilities not available with machining
- Tooling that is optimized enables more efficient operations
- 3D Printing runs in a lights-out environment:
  - Printers can be started at the end of the day, and jigs or fixtures are ready in the morning
  - Multiple printers can be deployed for low CapEx, dollars relative to other processes
- Engineers and staff are energized about the possibilities unlocked by 3D Printing
- Companies with 3D Printers are attractive to young, talented engineers
- Existing employees are motivated by using 3D Printers

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