

WHAT IS 3-D PRINTING?: Created in 1988, 3-D printing is the process of producing a solid object directly from a computer digital model. The 3-D printer creates or “prints” an object by layering small, thin layers of plastic or another substance, stacking them on top of one another to form a solid object. For example, “Just think of the layers in a seven layer cake that are stacked to create one large cake.”

CLINICAL BENEFITS OF 3-D PRINTING?:

- Meets an immediate need,
- Product development,
- Customization,
- Creates a solution that can be reproduced efficiently, and
- Cost effective solutions.



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3-D Printing



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HOW IT'S MADE



MouthStick Holder

3D printing explained

Almost all manufacturing processes can be divided into three basic types:

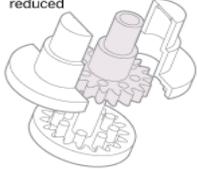
Cutting

Item made by removing material from a solid block, for instance by carving, chiselling or cutting



Forming

Item made by shaping a material, for instance by moulding, casting or forging. Material is neither added nor reduced



Joining

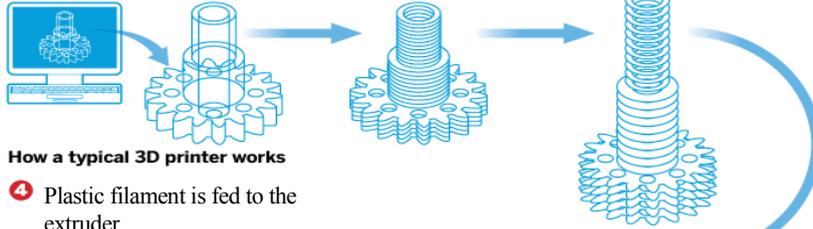
Item made by adding weight and volume, for instance by welding, riveting or 3D printing technology (see right)



FT Graphic: Ian Bott

The 3D printing process

- 1 Shape of desired part is modelled digitally using a computer-aided design program
- 2 3D printer software is then used to digitally divide the model into a series of very thin layers or 'slices'
- 3 The 'sliced' file is sent to the 3D printer

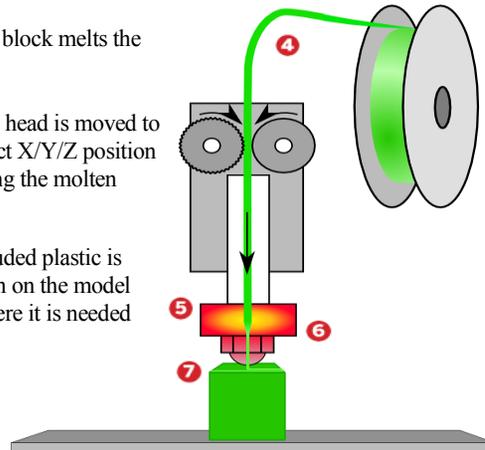


How a typical 3D printer works

- 4 Plastic filament is fed to the extruder
- 5 A heated block melts the filament

The print head is moved to the correct X/Y/Z position for placing the molten plastic

- 6 for placing the molten plastic
- 7 The extruded plastic is laid down on the model layer where it is needed



Some current applications

Aircraft components

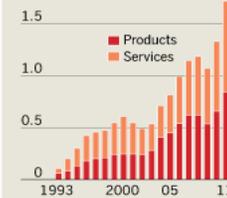
Precision internal parts for combustion jet engines which offer reduced weight and tooling time

Jewellery

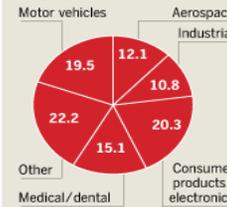
Complex designs can be fabricated using either plastics or metals

3D printing industry

Sales (\$bn)



Usage by industry, 2011 (%)



Sources: Wohlers Associates; FT research



Custom Mount



Rotary Mount Adapter



Replacement Tripod Leg



App Specific Keyguard for iPad