How does 3D printer work?

Layer by layer, 3D printers create objects from adhesive plastic materials. Here we introduce to you the process of creating an object of 3D printer, along with advanced printing technologies that will soon be commercialized in the future.

Layer by layer, **3D printers** create objects from adhesive plastic materials. The following article helps you better understand the process of creating an object of 3D printers, along with advanced printing technologies that will soon be commercialized in the future.

Speaking of 3D printers, people often think of a **complicated printing process** . But not so. There are many interesting things around creating an object from a 3D printer. Here is the mechanism of 3D printer operation at the consumer level. Note that you must use 3D images to print.

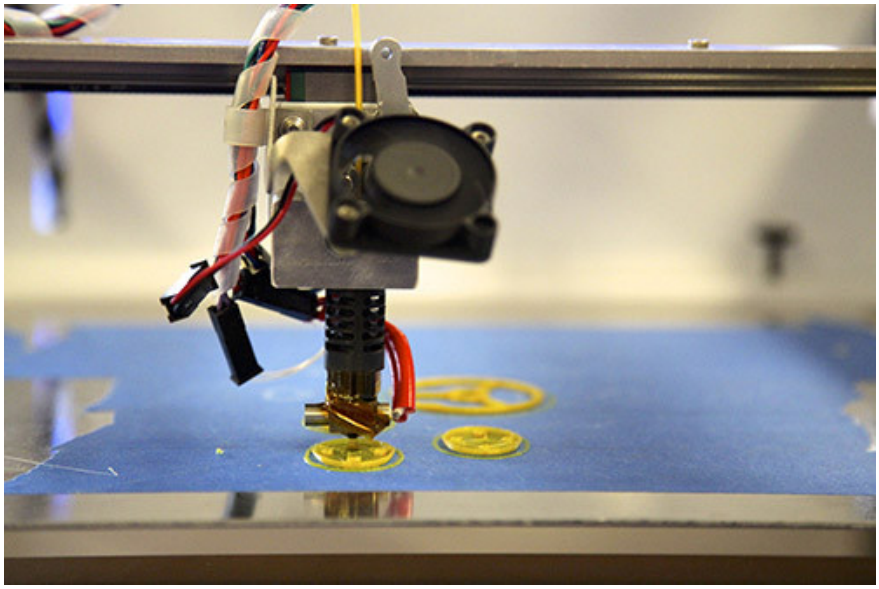
The input is plastic, the output is adhesive plastic

3D printer users will select 2 types of input materials: **Acrylonitrile Butadiene Styrene** (ABS plastic) and **Polylactic Acid** (PLA plastic). Some printers only accept ABS plastic, others use both. These plastic input materials are fibrous, 1.75mm or 3mm wide.

ABS plastic is often used to create Lego toys. This is a chemical-based plastic, activated at high temperatures. PLA resins are naturally derived, such as corn and sugarcane, hard and shiny than ABS plastic. In addition to being used as input materials for 3D printers, PLA plastics are also used to produce biodegradable packaging.

Plastic fibers for 3D printers are expensive. MakerBot firm sells 2.2 pounds (990 grams) of PLA plastic fiber for USD 48 (VND 960,000). The firm estimates that 990 grams of plastic yarn can print 392 chess pieces.

The price of plastic yarns will be reduced if 3D printers become popular and plastic fibers are produced on a large scale. Another way to reduce input costs is to use a plastic fiber press. You put recycled or cheap plastic materials into a press to make plastic fibers.



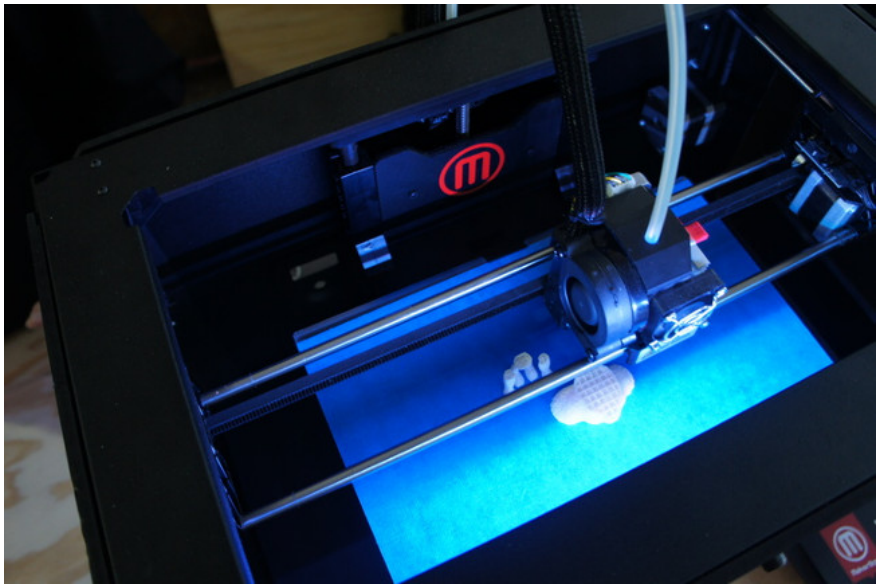
Once you have the plastic, you put it into a 3D printer through a part called a print head. The print head is shaped like a box with a nozzle. A transmission mechanism pushes each plastic part down the print head. Before the plastic is extruded from the tip of the needle, the plastic thread must pass through a heat and liquefied tube. Plastics through the print head are super-thin lines of only 0.1 millimeters. As soon as the air comes out, the plastic hardens very quickly, putting together layers.

ABS plastic should be printed on a hot surface, which also means that the bottom plastic will be slightly rolled up. PLA resin can also be printed on surfaces without heat.

Most 3D printers have a print head, ie the printed object has only one color. In order to have more than one color, one will have to change the plastic in the printing process. There are several types of printers, such as MakerBot's latest type of printer, denoted **Replicator 2x** with 2 print heads. It allows people to print objects with two colors. New York-based botObjects also promises to market a printer capable of mixing plastic fibers to print a full-color object.

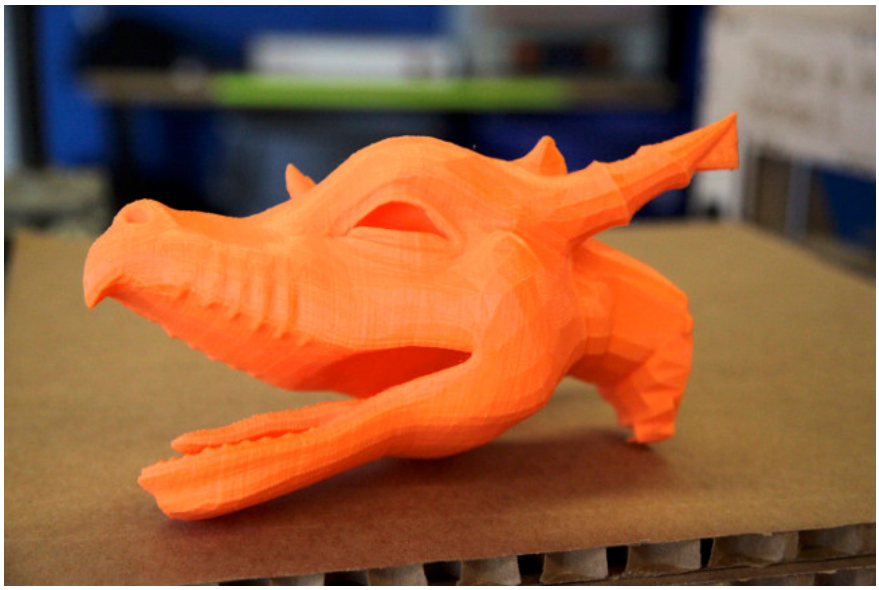
Print from front to back, layer overlap

3D printing is a layer printing technology. The print surface (often called a print bed) and the print head work together to make 3D printing. In the Replicator 2 printer model, the print head is held by a suspension system (illustration below). 2 horizontal metal bars make the print head move forward and backward horizontally. At the top of these 2 metal bars are attached to 2 other bars vertically, making the print head move forward and backward vertically. Thanks to the suspension, the print head can also move up and down to create 3-dimensional objects.



A printer named **RepRaps** has a relatively different 3D printing method than Replicator 2. RepRaps' print bed moves up and down, back and forth, while the print head only horizontally. The DeltaMaker printer model has a 3-way moving print head.

3D printing can take a few minutes, hours or even days depending on the size and volume of the product. Recently, some artists used Type A Machines to print a dragon head sculpture of 3 x 3 x 2.4 m. They took up to 2 months to complete the work.



3D printers don't just print plastic

Not all 3D printers use the same printing materials. Professional 3D printers are capable of producing high quality products from diverse materials. At Shapeways, large-size 3D printers create multiple products at the same time. Raw materials are not limited to ABS and PLA. It can be brass, ceramic, steel and 5 other plastics.

Some types of 3D printers use laser casting technology, ie using lasers to mount pieces of material together. Some laser casting patents will expire next year, paving the way for mass production of 3D printers for consumers.

Form1 of the FormLabs laboratory is a model that uses the most advanced non-traditional printing technology to be commercialized soon. Metal and hybrid printers (between traditional and non-traditional printing) will be the next devices available in the consumer market.