3D-Printer

- 3D printers use standard inkjet printing technology to create parts layer-by-layer by depositing a liquid binder onto thin layers of powder.

- Uses gypsum-like, non-hazardous, high performance composite material.

- CMYK (cyan, magenta, yellow, key(black)) color model used in the color printing as the color ink.

- Cyan, magenta, and yellow printing plates are carefully keyed, or aligned, with the key of the black key plate.

- Provides the resolution of 600 x 540 dpi (dots per inch).

- It can print the size details up to 0.1 mm.

Important Components

Print heads:

- Prints the cross sectional area for the first.

- Or bottom slice of the part onto the smooth layer of powder, binding the powder together.

- Then platform gets lower and the print heads apply the data for the next cross section onto the new layer, which binds itself to the previous layer.

- Similar to 2D printer, a 3D printer moves the print heads over a bed of powder.

- Uses a feed piston and platform, which can move after each layer printing.

- A roller mechanism spreads powder fed from the feed piston onto the build platform.
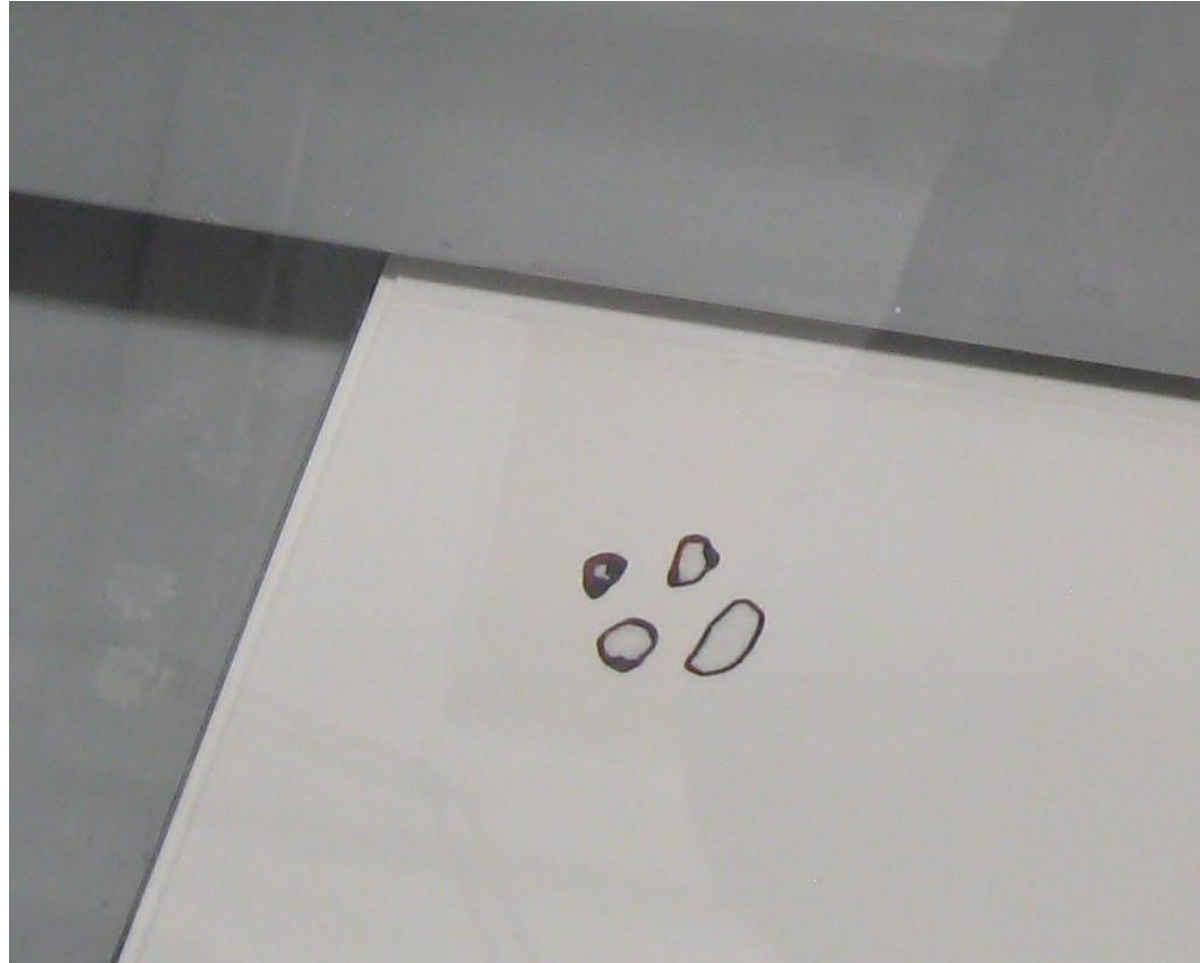
Binder Solutions

- If the object is not hollow then to print the inside part of the object it uses clear binder solution.

- For surface it uses defined color printing scheme CMYK color printing.

De-powdering

- The printed model had to be cleaned from excessive powder.

- In order to preserve the material it is vacuumed back into the storage.

- After retrieving the models from the powder they are cleaned with pressured air.
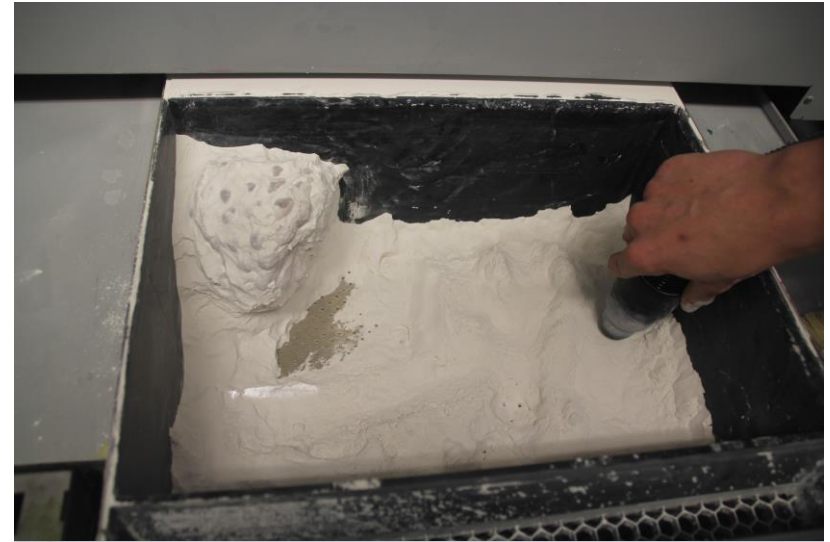
Post-processing

- After de-powdering, the printed 3D object is still fragile.

- To strengthen the printed we apply sealing-liquid to close the porous material on the surface.

- Afterward an additional drying time of one hour is necessary.

- Cost for 3D printing goes around 0.50 euro/cm3.

- Post-processing is the most time-consuming part of the process.

- 3D printers build at a vertical rate of 25mm - 40mm per hour.