The 3D Printing Process

Regardless of which approach a 3D printer uses, the overall printing process is generally the same. In the book “Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing,” Ian Gibson, David W. Rosen and Brent Stacker list the following eight steps:

What is CAD print?

CAD printing refers to **the specialized printing process associated with CAD design**. CAD is a combination of advanced software and hardware that allows architects and engineers to design everything from vehicles and aeroplanes to furniture and large-scale structures.

1. **CAD —** Produce a 3D model using **computer-aided design** (CAD) software. Opens CAD is available via the open source community. The software may provide some hint as to the structural integrity you can expect in the finished product, too, using scientific data about certain materials to create virtual simulations of how the object will behave under certain conditions.
2. **Conversion to STL —** Convert the CAD file/drawing to the STL format. STL or **standard tessellation language**. Most 3D printers can use STL files in addition to some proprietary file types such as ZPR by Z Corporation and ObjDF by Objet Geometries.
3. **Transfer to AM Machine and STL File Manipulation —** A user copies the STL file to the computer that controls the 3D printer. There, the user can designate the size and orientation for printing. This is similar to the way you would set up a 2D printout to print 2-sided or in landscape or orientation.
4. **Machine Setup —** Each machine has its own requirements for how to prepare for a new print job. This includes refilling the polymers, binders and other consumables the printer will use. It also covers adding a tray to serve as a foundation.
5. **Build —** Let the machine do its thing; the build process is mostly automatic. Each layer is usually about 0.1 mm thick, though it can be much thinner or thicker. Depending on the object’s size, the machine and the materials used, this process could take hours or even days to complete. Be sure to check on the machine periodically to make sure there are no errors.
6. **Removal —** Remove the printed object from the machine. Be sure to take any safety precautions to avoid injury such as wearing gloves to protect you from hot surfaces or toxic chemicals.
7. **Post processing —** Many 3D printers will require some amount of post processing for the printed object. This could include brushing off any remaining powder or bathing the printed object. The new print may be weak during this step since some materials require time to cure, so caution might be necessary to ensure that it doesn’t break or fall apart.
8. **Use or application—** Make use of the newly printed objects.