



Material Jetting (MJ)

Another 3D printing technology is material jetting. This is a method whose processes work similarly to those of a standard inkjet printer. However, instead of a single layer of ink, many thin layers are applied on top of each other until the desired shape is achieved.

In material jetting, a print head sprays several hundred tiny photopolymer droplets that are cured using UV light. Once a layer has been applied and cured, the build platform lowers by exactly the height of one layer, forming the base for the next layer. This process is repeated until the desired shape and size of the 3D product is achieved.

Material jetting also enables multi-material printing, which means that several materials and colours can be processed simultaneously. This is possible by storing and processing each material in a separate print head. The resulting composite material is also called digital material and is ideal for prototyping, with components that closely resemble the future original object.

In contrast to other 3D printing processes, material jetting differs significantly in that the printing system applies the material in a line and at high speed. Other methods, on the other hand, use individual points to trace the defined path, which outline the cross-section of the object. The advantage of the material jetting method is that by applying the material in a line, several objects can be created in a single line without interfering with the printing speed. It is only necessary to ensure that the models are arranged correctly and that the required space between the individual construction lines is maintained.

Objects produced using material jetting require support structures. These consist of soluble materials and are printed at the same time as the object itself and are simply removed during post-processing. In addition, the MJ process offers the possibility to produce objects from different materials in full colour printing.

In medical technology, the process is often used for the production of anatomical models thanks to its multi-material printing potential. These can be reproduced true to scale and in different colours, enabling doctors to explain diseases and procedures to their patients better and more comprehensibly.

Innovative Ansätze

- ♦ **Category:**
Material jetting
- ♦ **Assigned printing processes:**
MultiJet Modelling & PolyJet Printing
- ♦ **Rationale:**
Spraying molten art or wax material onto building platforms + cooling + building up the workpiece layer by layer.

Support structure necessary
- ♦ **Area of application:**
Prototypes, functional models, injection moulds
- ♦ **Advantages:**
filigree workpieces possible

High precision

Applicable in series production

High surface quality

Enables printing in full colour models

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