SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF AUTOMOBILE ENGINEERING

19AUT303 – Additive Manufacturing and its applications

III YEAR / V SEM

UNIT – 4 POWDER BASED ADDITIVE MANUFACTURING SYSTEMS

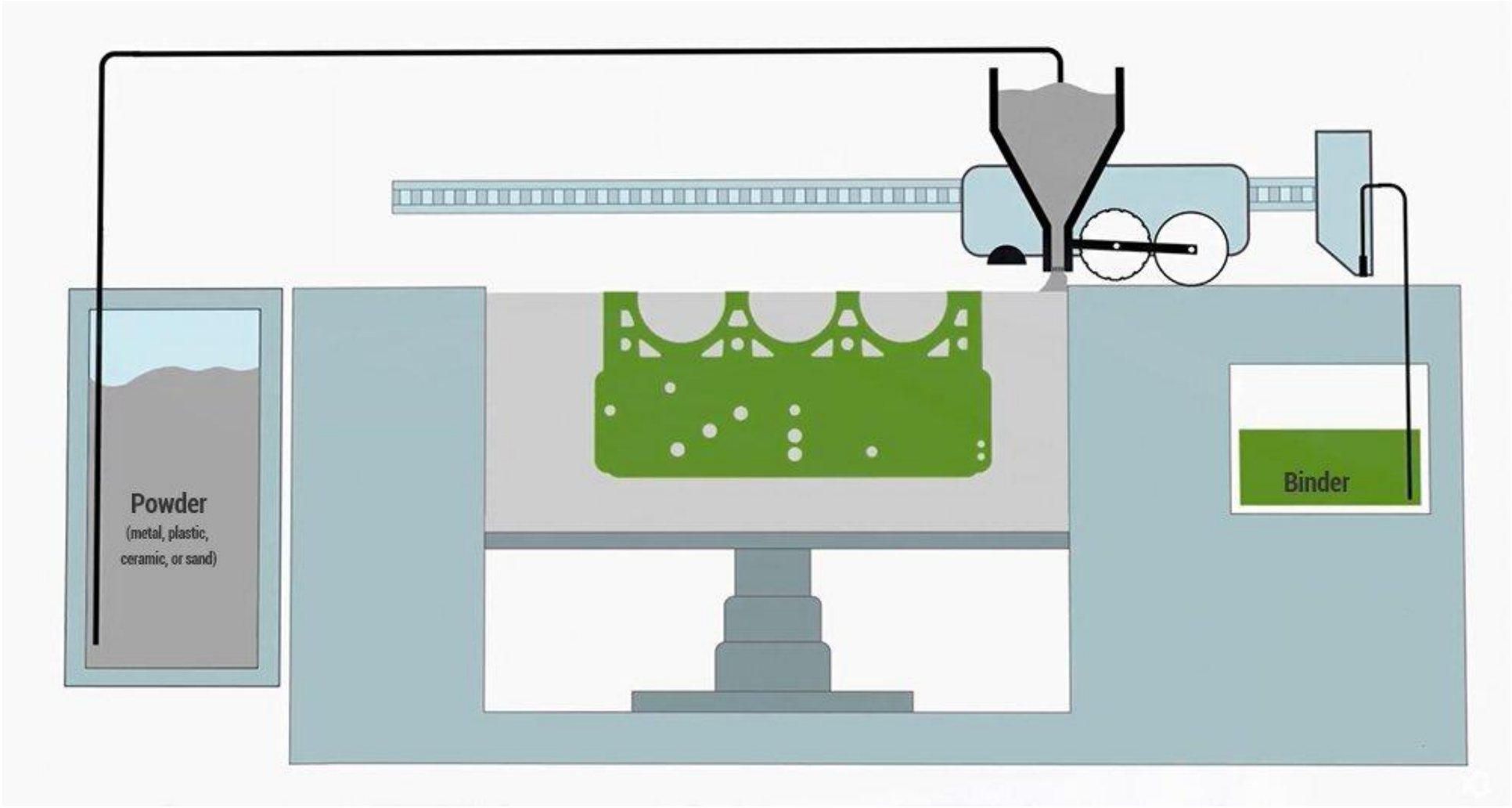
Topic – Binder Jet Technology

Binder Jet Technology (BJT)

Definition

Binder Jetting is a **3D printing technology that uses powder materials and liquid binding agents to create solid and complex parts.** During the build process, a fine layer of a powder material is selectively bonded by an industrial print head.

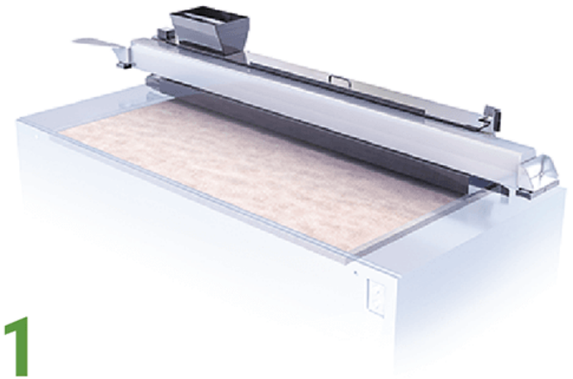
Working



Working (Contd.,)

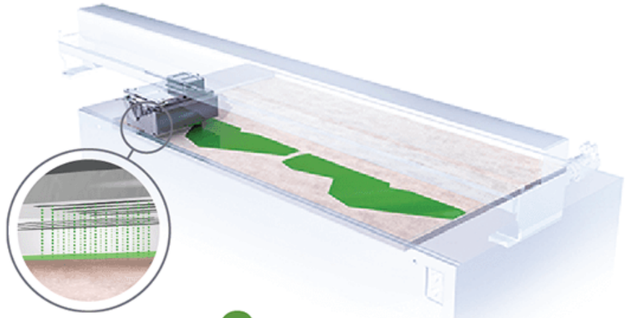
Binder Jet 3D Printing

Liquid binder is selectively applied to a thin layer of powder, layer by layer, to form high-value parts and tooling



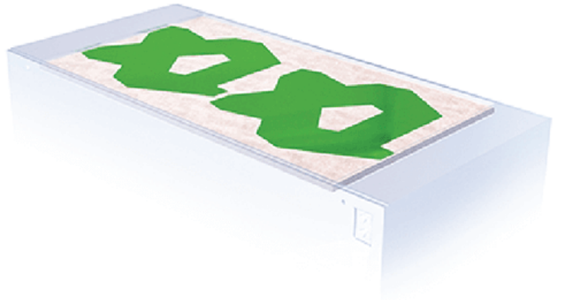
1

Powder is deposited.



2

Inkjet applies binder.



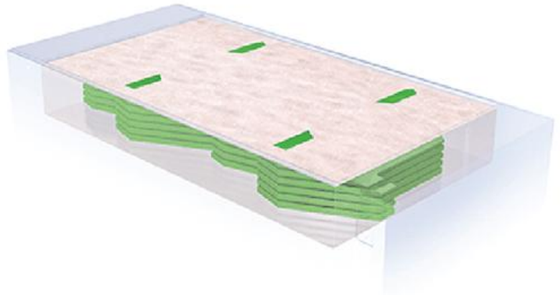
3

Each layer is printed fast.

Working

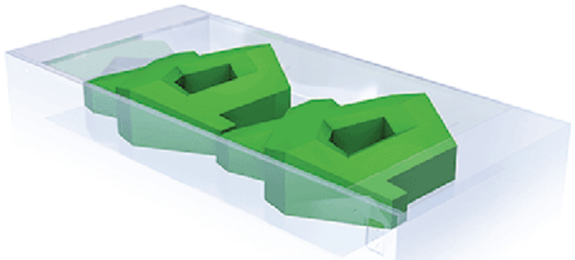
4

Powder is recoated.



5

The process repeats.



6

3D printing is complete.

Working (Video)

https://youtu.be/0Q0iHS-9Ti0

Advantages	Disadvantages
Materials Binder jetting is compatible with a wide range of powdered materials currently available	**Multi-steps.** Binder jetting is a multistep process requiring post-processing steps (curing and densification), which, in some cases, involve additional equipment.
Process Most binder jet printing processes operate at room temperature and atmosphere, avoiding issues related to oxidation, residual stress, elemental segregation, and phase changes, making the powder around the parts in the build box highly recyclable, saving on material costs, researchers say.	**Distortion risks.** The process of making the binder jetted parts more dense – sintering for example – can result in distortion of the geometry. However, this should be avoidable with proper software calculations in advance.
Size By avoiding the use of expensive sealed chambers for vacuum or inerting, the build volume of binder jetting 3D printers is among the largest of all 3D printing technologies while still maintaining the high resolution afforded by inkjet.	**Manual depowdering** (removing parts from the bed of metal powder) is necessary for most metal parts because they are delicate in their green state. Some depowdering automation is possible depending on the part geometry.
Volume Batches of different parts are printed at once. This high-volume production capacity makes it ideal for companies that want to print a lot of complex parts.	
No supports The need for support structures is eliminated or significantly reduced for any part geometry produced by binder jetting because the powder bed provides enough support	
Speed Binder jetting is fast and has high production rates so it can produce large volumes of parts more cost-effectively than other AM methods.	
Versatile Binder jetting can produce various densities with controlled porosity based on the sintering temperature and time, which leads to a wide range of uses	

Thank You